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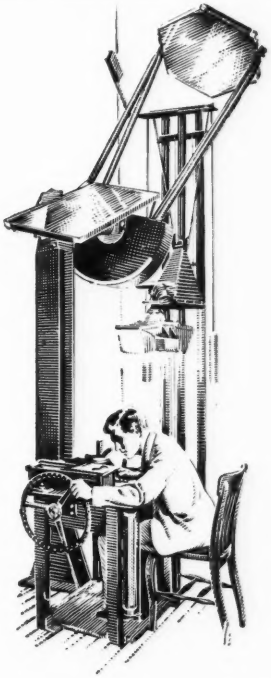

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ELECTRICAL REVIEW

September 8, 1944

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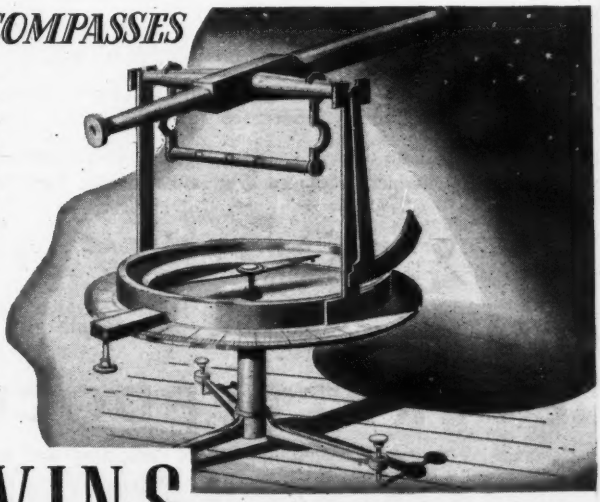

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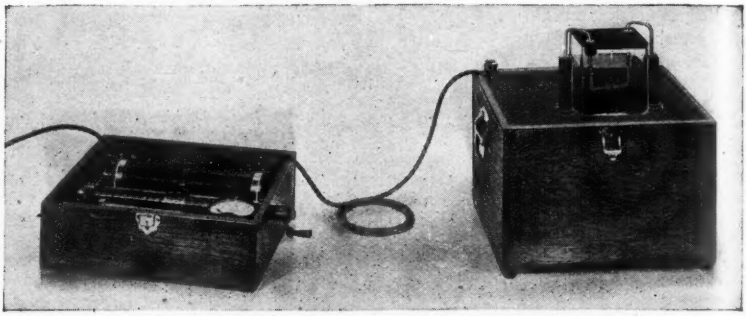

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXV. No. 3485. SEPTEMBER 8, 1944 9d. WEEKLY

Contractors as Retailers

Joint Showroom Proposals

ELECTRICAL contractors have lost a good deal of profitable business in the past because of their general weakness on the retail side. There have been several reasons to account for this and often the difficulties have been too great for the contractors to overcome individually. This has led to proposals, from time to time, that the contractors in a particular district should combine to establish a central showroom or selling depot.

There is much to be said for the idea. It seems obvious that such an establishment would create a much better impression upon the public than a number of small scattered shop windows and moreover would give the contractors a better chance to meet the competition of a live electricity authority with well-arranged central premises.

Principle and Practice

For these reasons such proposals have generally met with unanimous approval, in principle, but so far attempts to put the principle into practice have not got very far. Of course during the past five years the war has prevented the realisation of projects of this kind, but quite apart from this there are other lions in the path. In the first place, contractors in business in a large way, including a substantial retail side, may feel that they are capable of setting up showrooms practically as good as any which joint action could provide. Why, therefore, should they tie their hands by subscribing to a scheme which although backed by a majority, would probably not fit in with their ideas?

Conversely, the "small man" may fear that he will be committed to a contribution beyond his present means, whatever good results may accrue to him in the future. Or he may think that he will have too little say in the arrangements if "say" is in proportion to the financial backing provided and not according to numbers.

Possible Weaknesses

Another possible cause of failure is suggested by "Pilgrim Two" in the September *Electrical Contractor*. He says that in a combined shop there is no "boss"; the staff are possibly some friends of the group running the showroom; and the inefficiency of one or two soon spreads throughout the whole staff. To run such an establishment successfully means hard work, very skilful buying and perfect supervision, regular stocktaking and seeing that shelves and bins are turned out monthly and bad stock is cleared.

In other words, although they are not actually used by "Pilgrim Two," "Everybody's business is nobody's business," but a possible remedy is that suggested by the Cardiff Branch of the Electrical Contractors' Association which has the subject under consideration at the present time. It is that a competent manager with a thorough knowledge of the trade should be employed and although the report does not say that he should be given a free hand in running the business surely that is implied.

The arguments against joint showrooms no doubt have much weight but they may also be reflections of that rugged individualism which has always characterised

electrical contractors. If the idea is worth while as likely to help maintain the contractors in business, to say nothing of enabling them to improve their service to the public, individualism must give place to common action. There have been signs during the war of a breaking-down of the contractors' isolationism. Like many others they have had to meet some unusual conditions and, through their Association, they have shown a greater tendency to work together. After the war even more unusual conditions may prevail and they may find co-operation even more imperative if they are to survive.

Forty-Hour Week

DISCUSSIONS have taken place between the trade union side of the National Joint Industrial Council for the Electricity Supply Industry and the E.P.E.A. with regard to the adoption of a forty-hour week in the industry after the war. It was agreed that the employees' sides of the N.J.I.C. and the National Joint Board should be recommended to act jointly to secure the adoption of the forty-hour week without diminution of remuneration and that they should press the employers for the appointment of a "tripartite" committee representing employers, staff and operatives to study the matter and, in the event of failure, "to continue to co-operate as circumstances warranted."

Electrical Reorganisation

RECENTLY representatives of the Electrical Power Engineers' Association met members of the Economic Committee of the Trades Union Congress (including Sir Walter Citrine) to discuss the post-war reconstruction of the electricity supply industry. Previously a draft memorandum had been prepared in which the T.U.C. Committee visualised the public ownership of fuel and power as a single industry. The proposals included the abolition of the Electricity Commission, a step to which the E.P.E.A. demurred. Its reasons for urging the retention of the Commission "with its powers and authority modified to suit the new conditions" are said to have impressed Sir Walter Citrine and his colleagues. The E.P.E.A. representatives also showed themselves to be in line with the rest of the electrical industry when they dissented from the idea of combining electricity and gas. They mentioned the benefit accruing to the consumer from the competition between the two industries.

"More Definite"

THE report of the matter in the *Electrical Power Engineer* concludes that having regard to the advice given by the E.P.E.A. and the Electrical Trades Union "both the T.U.C. and the Labour Party would have to look into the matter again and make more definite recommendations." Is it thus suggested that the Labour proposals were produced without proper appreciation of all that was involved? That has certainly been the impression given by what has already appeared on the subject from the quarters mentioned.

The Ontario System

RANKING among the large undertakings of the world, the system administered by the Hydro-Electric Power Commission of Ontario has a long record of efficient service. Plans for developing the water-power resources of the Province which were in hand well before the outbreak of hostilities have enabled the Commission to cope with the spectacular growth of load which resulted from the change-over to war production and, as Dr. Hogg points out, this has been an important factor in the outcome of the struggle in which mechanised equipment has played so vital a part. Attention is now being turned to the anticipated big post-war developments, particularly the exploitation of iron-ore deposits, which are likely to have a far-reaching effect on Canadian economic life.

Co-operative Enterprise

WITH talk of reorganisation in the air it is interesting to consider the system which has proved so successful in Ontario, although conditions there are, of course, different from our own. The basic principle of what is termed a "co-operative municipal-ownership enterprise"—the Southern Ontario system—is that electrical service is given by the Commission to municipalities and by them to the ultimate consumers at cost. A move has now been made to help small municipalities whose cost of power is relatively high from a pool contributed to by all cost-contract municipalities. Secondly there are the rural power districts which since the beginning of this year have

been combined to form three districts with a uniform tariff structure throughout. Thirdly, the Commission holds and operates the Northern Ontario Properties in which power is sold for the most part to companies. The undertaking right from its inception has been self-supporting, receiving no contributions from general taxes except in connection with the rural power districts. In the case of the latter, to assist agriculture the Province facilitates the extension of electrical service by grants in aid of the capital cost.

Lamp Sizes

THERE have recently been discussions at meetings of various branches of the Electrical Contractors' Association regarding lamp wattages. The principal point at issue has been the desirability or otherwise of the 75-W size the production of which is at present in suspense. Some think that it is an awkward and unnecessary intervener between the 60-W and 100-W lamps while others consider it a useful compromise when 60-W is too little and 100-W too much. Opinion seems to be about equally divided. The *Electrical Contractor*, in commenting on the matter, suggests that there is no need for both 40- and 60-W lamps and that a 50-W size could take the place of both. But why not just abolish the 40-W ? Any situation in which its use is justified (halls, lavatories, etc.) could probably be sufficiently lighted by a 25-W lamp; in other places it is quite inadequate.

Aluminium Busbars

IT is interesting to have some information regarding the operation of aluminium busbars over a period of thirty years, especially when they have served in the somewhat onerous conditions prevailing at sea. The bars in question are those which were put into the *Aquitania* in 1914 and at that time they were an innovation. Details of them are given in a note in this issue. They were conservatively rated on account of the higher temperatures in which they were required to operate. B.S.S.159 assumes a maximum of 30 deg. C; the *Aquitania* busbars work in air at between 32 and 49 deg. C. The bars are highly polished; they have no protective coating. Apart from a deposit found in the earlier years, which has not recurred, on the faces of some aluminium connecting straps the only occasional slight deterioration noted was at the copper-aluminium contacts on the auxiliary boards. This would probably not have occurred if the joints had been made with vaseline.

Meeting Civilian Needs

REFERENCE has been made recently to the decision of the American authorities to permit manufacturers to produce certain articles, including some electrical equipment, for civilian use. In this case the limiting factor is the availability of labour and materials. A similar decision has been made in New Zealand to enable factories engaged upon war contracts to give employment to their workpeople now that there is a falling-off in these contracts. It is alleged in the *New Zealand Electrical Journal*, however, that the Electricity Controller has objected to this as owing to the shortage of power in New Zealand he considers it undesirable to add more electrical appliances to the mains.

Chromium Plating

ALTHOUGH chromium materially increases the resistance to wear of steel parts, the hard deposit is relatively brittle and, unlike nickel, does not provide a reliable means of increasing their strength. An uninterrupted supply of electricity is especially necessary with chromium, as any stoppage of current that is more than momentary may produce laminations. In that case the chromium deposit should be stripped in a special bath and the process restarted. Simple means of indicating a cessation of supply, such as the dropping of an armature of an electromagnet connected across the circuit, should be installed.

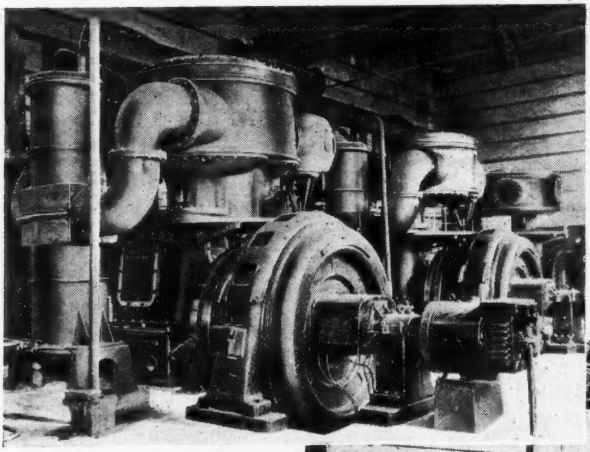
End of D.B.S.T.

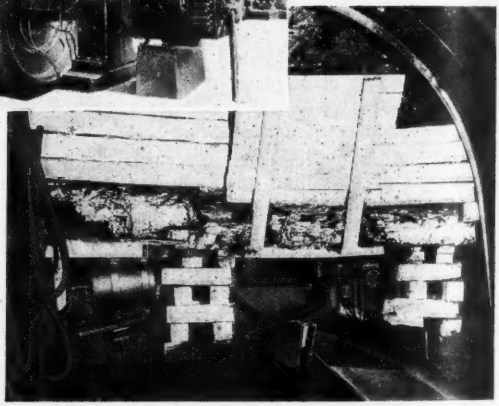
AT the end of next week extended double summer time comes to an end and millions of clocks will have to be put back an hour—but not the clocks of time recording machines. A note from the International Time Recording Co., Ltd., warns against this practice as it is likely to put the connected mechanisms out of adjustment. Instead, the clocks should be stopped for an hour, and this also "goes" for the master clocks in electric time system equipments and for striking clocks.

Coal Winning

Underground Operations from the Coal Face

IN the article " Colliery Electrification " in last week's *Electrical Review* we outlined the reasons behind the decision completely to electrify the Treeton Colliery of the Rother Vale Colliery Branch of the United Steel Companies, Ltd., in the South Yorkshire coalfield, on the basis of all public supply. In this article we deal with the electrical applications to the production of coal from the face and its transport to the pit bottom.





(Above) Compressors supplying the coal cutters in the Barnsley seam are electrically driven.
(Right) Belt face conveyors are installed parallel with the face and each section carries coal inwards to the junction of the face and gate conveyors

We have said that the colliery is completely electrified, and that is perfectly true despite the fact that the two faces in the Barnsley seam are operated by compressed-air-driven coal-face machinery because the air compressors themselves are now entirely electrically driven. There are three compressors installed in the power house on the surface and two of these were purchased new under the latest modernisation scheme. These are two Belliss & Morcom two-crank, two-stage compressors, each capable of delivering 4,080 cu. ft. of free air per minute at 80 lb. per sq. in. gauge. The units are mounted on independent bedplates and the driving motors have a rigid half coupling bolted directly to the flywheels. Each machine has an automatic air inlet control valve, an intercooler and discharge release gear.

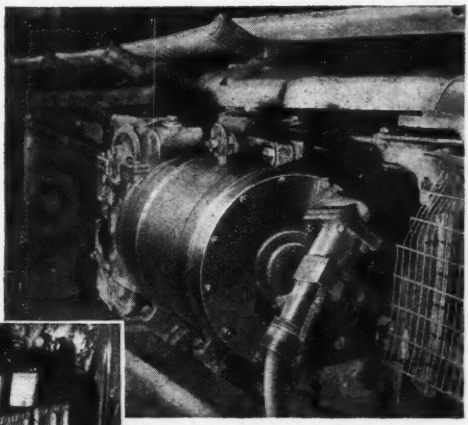
The directly coupled motor of each compressor is a G.E.C. salient-pole synchronous induction machine of 740 HP, 250 RPM. It operates at 3,000 V, 3-phase, and is designed for running at a leading power factor of 0·75 at full load. When at full load the two motors will correct the power factor of a load of 2,500 kW from 0·75 lagging to 0·95 lagging. The machine efficiency at full load is 93·25 per cent. The third compressor is also of Belliss & Morcom manufacture with a capacity of 4,000 cu. ft. per minute at 80 lb. per sq. in. It is driven by a 775-HP English Electric s.r. induction motor supplied at 3,000 V.

For the control of the three compressors there is a five-panel main switchboard which incorporates three stator cubicles, two synchronising cubicles, two field control pillars and three motor-operated liquid starters, all of G.E.C. production. This switchboard is built in flush with the power house wall. The rupturing capacity of the compressor switchgear, *i.e.*, the three

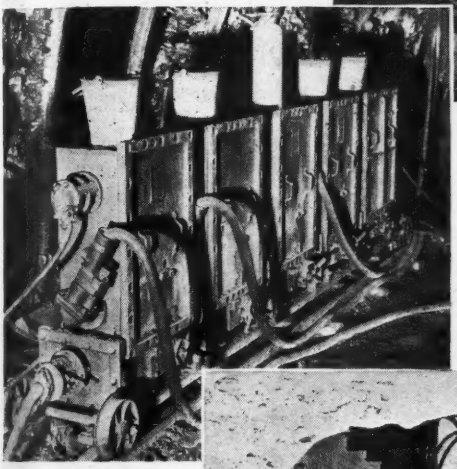
circuit-breakers in the stator cubicles, is 100 MVA.

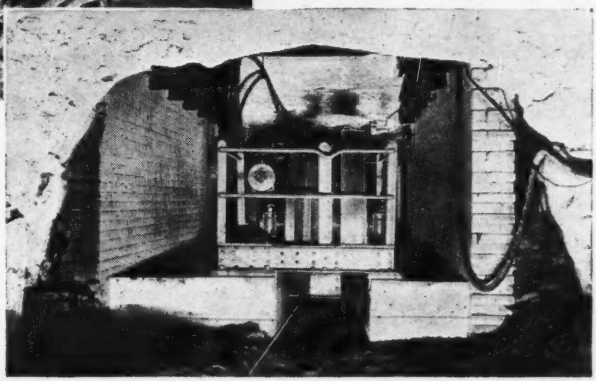
The coal-face machinery—coal cutters, conveyors, etc.—in the three coal faces in the High Hazel seam and the two faces in the Haigh Moor seam are all electrically driven. The coal cutters are of the standard Mines Department type and in each case a 50-HP motor supplied at 500 V is totally enclosed in the flameproof housing and transmits to the chain sprocket through a gearing with a ratio of about 18½ to 1. The actual motor speed is 1,470 RPM.

In all the seams the coal is first loaded on to belt face conveyors, which are installed parallel with, and about 2 ft. from, the actual face at the start, and each section of the conveyor carries the coal along the face to a centre point which is the junction of the face and gate conveyors, the gate conveyors running at right angles to the face conveyors. Each face conveyor will deliver up to 100 tons of coal per hour, and is driven by a 10-HP motor which is bracketed to the sub-structure of the conveyor and transmits to the end drum of this conveyor through gearing with a ratio of about 16 to 1. The gate conveyor is a similar but larger equipment which carries the coal back towards the pit bottom for a distance of up to 300 yd. or so, where it is handled by the main or subsidiary haulages after being discharged into tubs directly from the belt.



Gate-conveyor motor mounted about mid-way along the conveyor





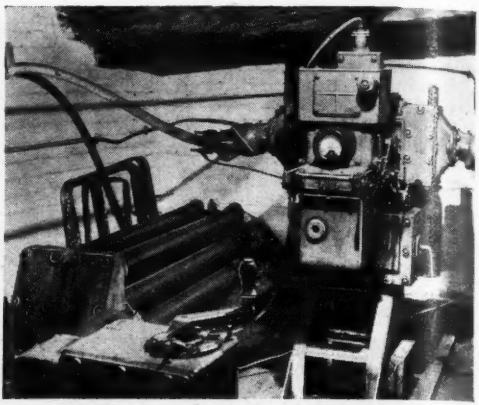
(Above) Five-panel gate-end switchboard supplying coal cutters, h.f. drills and face conveyors.
(Right) Haulage equipment, with motor and control gear, in a hewn-out brick-lined chamber

A scheme of standardisation has been attempted for the motors at the coal faces, and although it is not always possible strictly to adhere to this on account of variations in gradients and lengths of the faces, the 10 HP cited for the face conveyor is one size employed for this type of equipment and 25 HP is the size

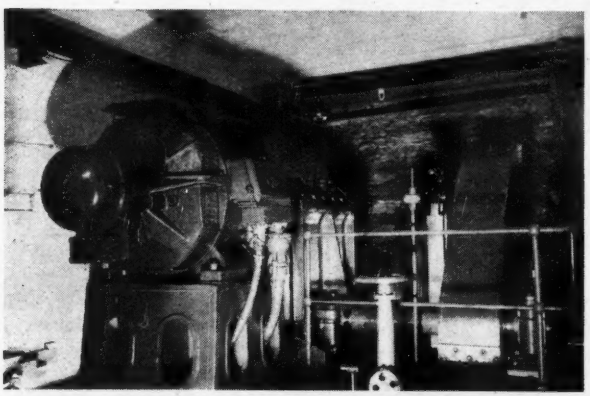
adopted under the same scheme for the gate conveyors. In this way the number of spare motors is reduced to a reasonable minimum.

The 25-HP motor on the gate conveyor is mounted similarly to the 10-HP motor on the face conveyor, and the method of transmission is also similar, except that in this case the motor is at a point about midway along the conveyor.

Considerable marshalling of the full and empty coal tubs for the rope haulages is required at the end of the gate conveyor, and for this purpose there is in each case a small 10-HP electrically-driven Pickrose haulage installed at floor level at this point. The supply to the gate conveyor and to the Pickrose haulage is obtained from a two-panel gate-end switchboard situated on the face side of the discharge end of the gate conveyor, while a five-panel gate-end switchboard nearer still to the coal face is used for distribution as follows: Two units for the coal cutters, two for the face conveyors and one for high-frequency drills (150 cycles). These high-frequency drills are used for boring shot firing holes into the coal face after the coal has been undercut.



Haulage motors are generally controlled by oil circuit-breakers for stator switching and drum-type rotor resistance regulators



Each haulage room has an overhead crane to facilitate equipment handling

When the tubs have been filled from the gate conveyor and marshalled on their track as trains, they are conveyed by an endless rope haulage from the face. In the case of the High Hazel seam, this is effected by three 50-HP motor-driven haulages, each of which draws the train to the main plane. The tubs are here disconnected from the subsidiary haulages and reconnected to the main plane haulage which is driven by a 125-HP motor and is located near the pit bottom. In the case of the Barnsley and Haigh Moor seams similar schemes are in operation, but on account of the greater distances involved in the case of the Barnsley seam the main haulage is driven by a 250-HP motor while at Haigh Moor, due to the close proximity of the pit bottom, only 50 HP is required for the main haulage.

In each case the haulage equipment and its motor and control gear are housed in a brick-lined chamber hewn out of the coal or rock. The equipment is usually well spaced out with plenty of head room and the tendency nowadays is to equip each haulage room with an overhead crane to facilitate handling the gear during installation and maintenance work. The motors generally are 3,000-V slip-ring machines controlled by oil circuit-breakers for stator switching and drum type rotor resistance regulators sometimes with tubular external resistances. All this equipment is, of course, fully flameproof as are most of the motors underground to comply with the Coal Mines Regulations.

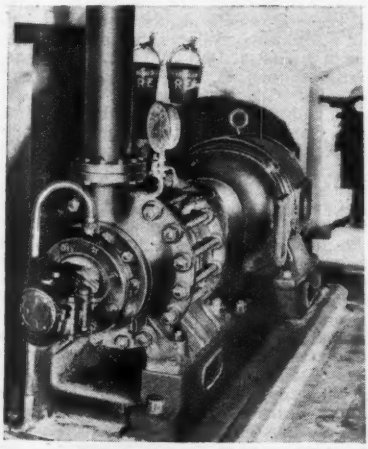
The tubs of coal upon reaching the pit bottom, gravitate from the main haulages to

the cages, where, in each case, there are two loading levels from which two of the four decks of the cage are loaded simultaneously. A 10-HP motor-driven creeper is used for raising those tubs which are required for loading at the higher level. The two top decks of the cage are loaded first and then the cage is raised a little to permit loading of the two bottom decks. Each deck accommodates two tubs and the whole eight tubs, representing a coal load of about 4½ tons, are raised to the surface by a new winder, which will be described in a subsequent article.

In order to reduce the time taken in getting the colliers to the coal faces in the cases of the distant seams, Barnsley and High Hazel, two men-riding haulages are used. The first of these draws a paddy, *i.e.*, a train of passenger trucks, for a distance of about 1,000 yards for both High Hazel and Barnsley. The High Hazel men then change to a second paddy for a ride of about another 1,000 yd. These trains are operated by main and tail rope and main rope haulages, and can travel at a speed up to 6 miles per hour.

Because of the drainage of water from the surface and from underground streams into the coal seams and workings, pumping is of great importance in most collieries. At Treeton the position with regard to pumping would normally be favourable from this point of view, and it is still further improved by the use that is made of a disused colliery nearby as a collecting station for drainage water. This disused colliery was the first in the group to be worked out, a number of years ago, and it has now been permanently arranged as a pumping station, thereby considerably easing the water problem at Treeton.

To ensure continuous running of the ventilating fan there are two motors in tandem, one on load and one idle



Each Wathwood pumping station is equipped with a 500 gal. per min. turbine pump driven by a 130-HP motor

At the old colliery the equipment comprises two vertical-spindle borehole pumps which are placed in the shaft approximately 285 ft. below the surface; each is driven through a vertical shaft from a motor at surface level. The equipment at the shaft top and the shaft itself are covered with a brick building, incorporated in which is the necessary lifting tackle for withdrawing the pumps, together with a 30-HP winch for shaft examinations and emergencies. Automatic equipment for starting and stopping the motors is fitted to a float in order to maintain the water level between certain limits.

In detail the equipment comprises a vertical-spindle turbine centrifugal pump capable of delivering 400 gallons of water per minute against a total head of 310 ft., supplied by the Pulsometer Engineering Co., Ltd., and driven by a Metropolitan-Vickers 65-HP, 1,460-RPM, vertical-spindle, drip-proof, slip-ring induction motor; and a similar pump, but capable of delivering 200 gallons of water per minute, driven by a B.T.H. 35-HP, 1,450-RPM, drip-proof, vertical-spindle, slip-ring induction motor. Both motors are on a 400-V, 3-phase, 50-cycle supply.

The bulk of the drainage at Treeton is into the Wathwood seam, but there are a few

small pumps at the lower workings which need not be considered here. The two pump houses in Wathwood are each equipped with a "Plurovane" high-lift turbine pump capable of delivering 500 gal. per min. against a total head of 600 ft. when running at 1,470 RPM. Each pump is driven by a 130-HP Mather & Platt enclosed-ventilated s.r. induction motor supplied at 3 kV, which is directly coupled to the pump through a flexible coupling. Pumping is carried out at night only so as to improve the load factor of the installation. During the day the water accumulates in a lodge—a bricked-in well—near the pit shaft. The pump houses are caverns cut in the rock or stone, and with their brick walls and good lighting they make spacious and generally good accommodation for the equipment, which, of course, includes the motor controls, with oil circuit-breakers for stator switching and drum-type resistance regulators for the rotor controls.

We have already referred to the very special attention given to ventilation at the Treeton Colliery by way of arrangement of all the main haulage roads as air inlet passages, with separate main air returns for each seam. All this system is served by one fan at the head of the upcast shaft. This is a Keith Blackman single-inlet mine equipment, which will provide 125,000 cu. ft. of free air per minute at 6 in. water gauge. It was installed in 1925 and provides adequate ventilation for the mine. The fan diameter is 65 in. It is driven by a 200-HP, 585-RPM, 3-kV Metropolitan-Vickers s.r. motor, but to afford adequate safeguards for the continuous running of this equipment, of outstanding importance from the safety point of view, there is a special arrangement with two motors in tandem. These are arranged with friction clutches on one shaft, and in the event of one motor failing the switching from the on-load motor to the idle motor can be done immediately. Transmission to the fan pulley is from the mid-point on the motor shaft through a heavy five-way vee belt with a speed reduction ratio of about three to one. The motor is started up by direct stator switching by means of a 150-A, 3,000-V Ferguson Pailin oil circuit-breaker in conjunction with a Sandycroft resistance rotor starter.

Power Supply in Ontario

War Production Nears Peak in 1943

AFTER more than three years' spectacular growth of load, resulting from the change-over to war production, Ontario last year approached close to its peak output of industrial production for war. Mentioning this in his survey of the salient features of the Hydro-Electric Power Commission's report for 1943, Dr. T. H. Hogg, the chairman and chief engineer, says that the outcome of the present struggle is being largely determined by the ability to produce mechanised equipment, and in this Canada's considerable hydro-electric resources have proved an important factor.

Notwithstanding the many difficulties in the way of labour and material shortages the Commission was able to meet all the power demands for war industries and, except over a few peak-load periods, essential civilian requirements suffered no shortage.

The total power output of 11,730 million kWh was only slightly higher than the record amount produced in the previous year (11,674 million kWh). In the areas served by the Northern Ontario Properties curtailment of gold mining caused a 3·6 per cent. decline in the output for primary power. Severe snow and sleet storms in Eastern Ontario in the winter of 1942–43 caused widespread havoc, and when the worst storm for fifty years broke on December 29th, 1942, four weeks elapsed before the supply was completely restored.

The Commission now owns and operates 47 hydro-electric plants with an aggregate normal capacity of 1,630,000 HP. In addition it purchases 910,000 HP, thus putting into use in Ontario a total of 2,540,000 HP.

Three outstanding projects were completed last year—De Cew Falls, the Ogoki diversion, and a transmission line to Steep Rock Lake. The new plant at De Cew Falls, near the city of St. Catharines, with the power canal intake at Allanburg on the Welland ship canal and the outlet at Port Dalhousie on Lake Ontario, was officially opened by the Prime Minister (Col. G. A. Drew) on October 15th, 1943. It operates under a 265 ft. head and its single unit rated at 65,000 HP, but capable of developing 71,000 HP under favourable conditions, produces more power than do the nine units in the nearby original plant constructed in 1898, although the power house is only one-third the size. The turbine, which was transferred from Abitibi Canyon, was built by the Canadian Allis-Chalmers Co. and is of the vertical Francis type. It is directly connected to a Canadian General Electric generator (48,500 kVA at 13,800 V running at 150 RPM and generating at 25 cycles).

The water for this plant is made available by the increased diversion at Niagara resulting from the agreement with the United States respecting the use of the additional inflow

to Lake Superior provided by the Ogoki and Long Lake projects which divert water from the Albany River drainage basin 1,000 miles away. These two diversion schemes represent a considerable engineering feat; together they will make available a total of 360,000 additional horse-power at various sites along the Great Lakes-St. Lawrence River waterway.

The Ogoki diversion, started in November, 1940, was officially opened on July 20th, 1943. One consequence has been an increased flow of the Nipigon River which enables the Commission to provide more effectively the power required to develop iron deposits at Steep Rock Lake.

The diversion of the Seine River preparatory to the pumping out of this lake put out of commission the 10,000 HP Moose Lake plant of the Ontario-Minnesota Pulp & Paper Co. To replace this and provide 7,000 HP for the pumping and mining operations of the Steep Rock Iron Mines, Ltd., the Commission constructed a 120-mile transmission line from Port Arthur at a cost of about $1,500,000. Dr. Hogg comments that if the iron ore deposits come up to the standard anticipated in extent and quality the importance of these developments to Canadian economic life will unquestionably be far-reaching.

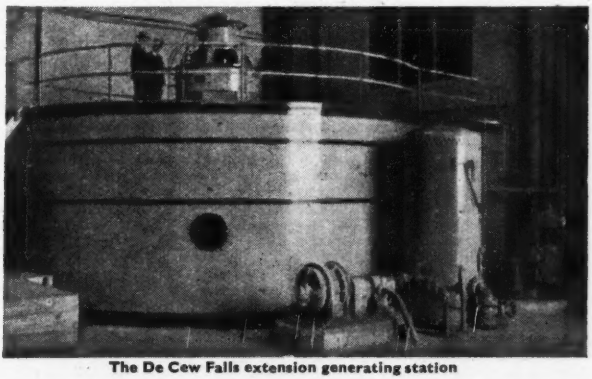
The third bank of transformers at the new 220,000-V transformer station at Burlington was placed in service on April 4th, 1943, increasing the station capacity by 75,000 kVA, and progress was continuing on the installation of the synchronous condensers previously reported, the first 40,000-kVA unit being nearly ready at the end of the year.

Preliminary studies and estimates were made in connection with the proposed Des Joachims development on the Ottawa River as a future source of power.

During the 1943 session of the Legislative Assembly a motion was passed asking the Commission to examine the causes of differences in the cost of power supplied to municipalities and rural power districts. In a report on the subject the Commission pointed out that so long as the basic conception of service at cost continued to govern its operations, differences in the cost of wholesale power as between partner municipalities could not be entirely eliminated. To reduce the differences it suggested that the Niagara, Georgian Bay and Eastern Ontario systems should be amalgamated and be known as the Southern Ontario system (this change has since been put into effect).

A comprehensive revision of its rural power service was made by the Commission and put into effect on January 1st, 1944. This amalgamated into three rural power districts (Southern Ontario, Thunder Bay and Northern Ontario) all the areas formerly served by the 120 rural power districts. It furthermore embodies for all areas served a uniform tariff structure with a common charge applicable to each class of service. Another matter affecting the rural service was the relaxation of the rigid control previously enforced by the Dominion Metals Controller by permitting service to farms where this would result in increased food production. From May to October, 1943, more than 2,100 farm applications were approved and most of these farms were actually being served by the end of the year.

As before, the Commission rendered considerable assistance to various departments of the Government and the armed services by its extensive research and testing facilities.



The De Cew Falls extension generating station

Among the new equipment in the Commission's laboratories which is illustrated in the report is an impulse generator which simulates lightning strokes for testing arrestors, transformers and other distribution equipment. It is compact, about 50 in. high, and mounted on a platform 32 by 72 in. Another photograph shows industrial infrared ovens for baking the finish on toolboxes.

Financial statements included in the report show that the total investment in power undertakings is now $487,022,998. Revenue during the year from customers in the Southern Ontario and Thunder Bay systems aggregated $49,517,905 (against $48,590,813), with a net surplus of $1,208,686 ($684,480). Revenue of the Northern Ontario Properties amounted to $4,834,378 ($5,156,247) with a balance of $396,429 ($611,334).

Survey of Wages

Increase of 79 per cent. since 1938

STATISTICS showing average earnings of over six million manual workers employed in manufacturing industries generally and in some of the principal non-manufacturing industries are published in the *Ministry of Labour Gazette*. The figures are based on returns received from 53,800 establishments. The earnings of women employed as part-time workers have been included on the basis of two part-time workers taken as representing one full-time worker.

The average earning in the last pay week of January, 1944, and, in brackets, the percentage increases since October, 1938, are as follows :—men, 123s. 8d. (79); youths and boys 46s. 10d. (80); women 63s. 9d. (96); girls 34s. 3d. (85); all workers 95s. 7d. (79). These are general averages covering all classes of manual wage earners including skilled and unskilled workers and they represent the actual weekly earnings inclusive of payments for overtime, night work, piece work, etc.

Wide Range of Earnings

The figures for different industries vary widely. The average percentage increases in the weekly earnings of men, between October, 1938, and January, 1944, ranged from less than 50 per cent. to over 90 per cent. while those for women ranged from less than 50 per cent. to over 120 per cent. The highest average earnings of men in the list are 141s. 10d. in the metal, engineering and shipbuilding groups, with a percentage increase over October, 1938, of 89; for all workers in this class the average was 111s. 2d. and the increase 86 per cent. The lowest average amount for all workers is 56s. in the clothing section, while the lowest for men is 90s. 5d. in the public utility services category. The latter figure represents an increase on 1938 of 43 per cent. and for all workers in the same group the average of 81s. 6d. is up by 37 per cent.

In view of the wide variations, as between different industries, in the proportions of skilled and unskilled workers and in the opportunities for extra earnings from overtime, night work and increased output by piece workers, the differences in average earnings shown should not be taken as evidence of disparities in the rates of wages prevailing in different industries for comparable classes of workpeople employed under similar conditions. The percentage increases in the earnings of all classes of workers combined are also affected by the changes which have taken place in the relative proportions of men, boys, women and girls employed in each of the groups of industries, the proportions of men, boys and girls having declined while those of women have increased.

Another table shows the average hours worked in the various groups in the last pay-week in January, 1944. In the metal, engineering and shipbuilding industries the number of hours was:—Men, 53·3; all workers 50·7. In the case of public utility services the hours were 49·6 and 48·1, respectively. A further table sets out the average hourly earnings in the last pay-week of January, 1944. In the metal, engineering and shipbuilding class the amount for men was 2s. 7·9d.; for youths, 1s. 0·7d.; women 1s. 6·6d.; girls 10·4d.; and for all workers 2s. 2·3d. In public utility services the earnings were:—Men, 1s. 9·9d.; youths, 9·5d.; women, 1s. 2·3d.; girls 7·9d.; all workers 1s. 8·3d.

Earnings during one week in October, 1938 and January, 1944, are compared in detail in another table which includes an analysis of the metal, engineering and shipbuilding groups. This reveals that in the electrical engineering industry the average weekly earnings of men over 21 years of age in January, 1944, were 133s. 4d., an increase of 79 per cent. as compared with October, 1938. For youths and boys the figure was 43s. 10d. (77 per cent. increase); for women of 18 or over 65s. 7d. (102 per cent.); girls, 35s. 9d. (85 per cent.); and all workers, 94s. (85 per cent.).

In the "electric cables, apparatus, lamps, etc." group, average weekly earnings in January, 1944, were 127s. 8d. for men (75 per cent. increase over October, 1938); 47s. 8d. for youths and boys (55 per cent.); 66s. 1d. (85 per cent.) for women; 36s. 7d. for girls (76 per cent.); and 84s. 11d. for all workers (70 per cent.).

For men employed in the electrical contracting industry, the weekly earnings were 129s. 6d., a rise of 64 per cent. as compared with October, 1938; for youths and boys, 37s. 10d. (79 per cent. increase); and for all workers, 96s. 3d. (70 per cent.).

In the electricity supply industry the weekly earnings of men were 105s. 8d., an increase of 46 per cent. over October, 1938; youths and boys, 35s. 2d. (34 per cent.); women, 67s. 6d.; all workers 98s. 6d. (43 per cent. increase).

Proposed Sydney Board

A REPORT in the *Industrial Australian and Mining Standard* states that the creation of an authority to be called the Sydney and Metropolitan Electricity Board is believed to be a recommendation in the report of Mr. S. F. Cochran, chairman of the Queensland Electricity Commission, who has investigated the question of electricity control in the New South Wales Metropolitan area.

The new Board would be vested with control of the Metropolitan electricity undertakings if the recommendations, which have been submitted to the Sydney County Council, are adopted.

The chief proposal is understood to be that the Board should control all electricity supplies between the coast and the Hawkesbury and Nepean Rivers. Its activities would be directed by a chairman with a salary of up to £2,500 a year and four part-time members with salaries of about £750 a year each. The undertaking of the Electric Light & Power Supply Corporation, Ltd., which supplies electricity in several large suburbs of Sydney, would be purchased and that of the St. George County Council would also be absorbed.

Domestic Installations

North American Practice and Opinions

By E. Arthur Pinto,
A.M.I.E.E., M.E.I.C.

RECENT discussions in England on the installation of ring mains and the cognate questions of domestic accessories, especially the use of new types of sockets and plugs, have given rise to interesting conversations with Canadian electrical engineers whose views are more likely to be unbiased than those of people who would be more directly, and often financially, affected by important changes in methods and materials. Although I am not in agreement with all the opinions which have been offered to me, nevertheless, temporary dissociation from the English industry during three years in Canada enables me to see justification for many of the criticisms expressed, so that it is hoped that these notes will be of some interest as representing a combination of the opinions of an English engineer working in North America and the more direct observations of Canadian engineers themselves.

A "semi-detached" view of current electrical installation questions is taken by the author who has been in Canada for three years, and he quotes the ideas of Canadian and American engineers

As in England, ring mains are in use in many Canadian industrial plants, but little if anything appears to have been done here respecting their use in domestic installations. It is agreed that there is much to be said in favour of the system, but it is doubted if the advantages are as great as some of its advocates would have us believe. The apparent doubling of the current-carrying capacity of the mains is a gain, but it is questionable whether this will not be more than offset by the longer runs, additional installation costs and the special fusing and other control problems which will be involved. Similarly, on the question of convenience and utility, there is much to say both for and against the system.

Most of those who support the use of ring mains appear to agree that the larger current-consuming devices in the average dwelling are not likely to be connected to the ring. These, generally, are the cooker, water-heater and washer which, in many cases, will be located in more or less close proximity to one another and often quite near the main distribution or service point. The ring main will therefore be of most value when serving lighting, radiators and the smaller portable appliances, such as coffee percolators, kettles, toasters, vacuum cleaners, etc., all of which are found in the average North American home and all of which are served from lighting points. The special cases of clocks and radio sets can be dealt with separately, the former by the use of special fused plugs and the latter by means of incorporated fuses, thus avoiding trouble through over-fusing. Refrigerators will be on the ring main or otherwise according to convenience of location.

Of all these classes of appliances, the radiators are those which require most consideration, on account of their heavy current as compared with the other appliances and it is here that my American friends make their first serious criticism. They agree that a ring main is in many cases ideal for connecting up *portable* radiators, but point out the many difficulties they involve in the way of special accessories, flexibles, etc. They ask: "Why have portable electric fires at all?" and, quite logically it seems, they point out that dwellings which are heated by coal or gas fires, as well as those blessed with central heating, do not have portable fires. Must electricity suffer from an inferiority complex? Let electric fires be fixed, they say, and much of the demand for ring mains, freak plugs and the like will disappear. Where radiators are used in Canada they are almost invariably found to be built in.

After all, we have already admitted and accepted the principle in the case of both tubular and panel heating and more use could be made of unit heaters in certain locations, now that these are made successfully in sizes from 1·5 kW up. The Canadian Electrical Code frowns on portable radiators and the types of flexible cords and even the length of these when used on heaters are controlled. (It should be mentioned that this Code is quite severe with regard to every type of flexible cord and the uses to which each may be put.)

Canadians and Americans have had much greater experience in the heating of buildings than we have had in England. This, of course, is in many areas due to climatic conditions. Every man's home, rich or poor, as well as every business premises, office, tramcar and omnibus, must be properly heated. Many systems are in use and these need not be dealt with here, but this aspect of life there is mentioned as lending weight to an argument put forward by my Canadian

friends. Some of them, with a knowledge of English conditions, point out that already many buildings in England are equipped with some form of central heating, that the number of these was rapidly increasing up to the outbreak of war and that after the war many of the new dwellings and other buildings to be erected will be similarly fitted up and the fact should not be lost sight of that very many of these new buildings will be taking the place of old-fashioned structures which have been destroyed with their equally old-type heating arrangements. In passing, it may be mentioned that in their letters home by far the most frequent criticism of England by Canadian soldiers stationed there has been concerning the extremely poor—they say non-existent—heating of the majority of our homes.

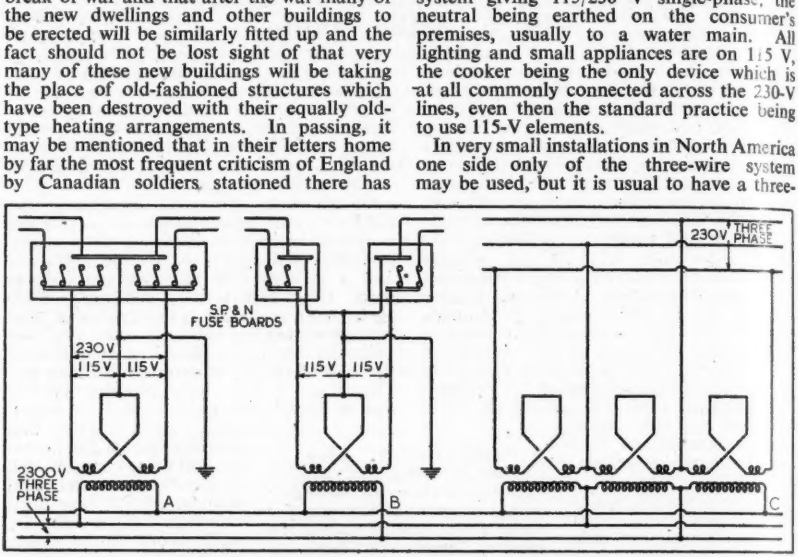
There appears to be real ground for asking if it would not be more worth while for English engineers to concentrate on evolving better systems of electric heating than to expend their efforts in designing new accessories for use with portable radiators.

Interior Distribution

If, however, our innate conservatism prevails to the extent of perpetuating what our American cousins consider our obsolete or at least obsolescent systems of domestic heating, then the present discussions with regard to the provision of suitable accessories will have to be brought to some definite conclusions, probably by compromising between various suggestions put forward recently in the *Electrical Review*. For the benefit of those who are not familiar with the North American distribution system as generally adopted, a brief outline of it is given here, as it will not only explain the Canadian views of the new proposals but it may even form a basis for dealing with some of the difficulties which have been indicated.

Referring to the accompanying diagram, the secondary supply is usually delta connected and each phase forms a three-wire system giving 115/230 V single-phase, the neutral being earthed on the consumer's premises, usually to a water main. All lighting and small appliances are on 115 V, the cooker being the only device which is at all commonly connected across the 230-V lines, even then the standard practice being to use 115-V elements.

In very small installations in North America one side only of the three-wire system may be used, but it is usual to have a three-wire secondary supply in the majority of installations. One advantage to be noted is that although the system has most of the advantages of a 230-V supply, better and stronger lamps and elements are used and at no place does the potential above earth exceed 115 V.



Schematic diagram of North American distribution systems
A, Standard 115/230-V single-phase service. B, One single-phase transformer supplying two small consumers at 115-V two-wire. C, 230-V three-phase, three-wire power service

Two Canadian engineers have suggested to me that this three-wire (per phase) system might form a safe, convenient and very adaptable alternative to ring mains. An opportunity has not so far presented itself fully to examine the suggestion, but it may be one which would repay some investigation. There would certainly be the disadvantage of the two voltages, though not on the same installation, during a transition period, but a corresponding difficulty will present itself in another form if ring mains come into general use for new installations. In any case, the fact remains that the system is standard in many millions of installations and there is no call or desire to depart from it.

In a subsequent article I propose to deal with the subject of the standardisation of accessories with particular reference to plugs and sockets.

Irish Electrification Plan

Expenditure of £17,000,000 Envisaged

RURAL electrification is the subject of a long report* prepared by the Electricity Supply Board, Eire, at the request of the Minister for Industry and Commerce. It is a document of 114 pages, including 18 appendices of statistical data, graphs, maps and illustrations, which envisages the extension on a national scale of the power supply network constructed in conjunction with the 1925–29 River Shannon hydro-electric development. The object is to make electricity available to farms and country communities throughout the twenty-six counties of Southern Ireland.

An introductory statement shows that electricity is already available to about 95 per cent. of the urban population and of villages within reach of the existing national network. But scattered dwellings and individual farms house more than half the total population of the country to whom electricity is not available.

Existing primary transmission lines operate at 110-kV with a secondary 38-kV network stepping down to 10 kV and to 380/220 V. Despite the extent of the present tertiary network (2,000 miles of 10-kV lines with 1,232 transformer stations) it serves a mere fraction of the rural areas of the country as a whole. To indicate how the existing "backbone" should be extended and assist the preparation of capital estimates, four trial areas were selected in Tipperary, Cork, Wexford and Louth which were typical in size (50—100—200 acres) and representative of the three main categories (dominantly milk producing, tillage and cattle grazing) encountered in Eire.

Capital Cost Estimates

Detailed engineering designs, working plans and unit costs of rural distribution networks suitable for that country have been prepared. Particulars given in the report of the systems completed for each of the trial areas show that an average of £45 may be deduced as the capital cost per rural dwelling for a distribution network constructed in a rural area with a density of only 15·2 rural dwellings to the square mile of farm area.

Technical investigation has shown that as a first approximation the capital cost per rural consumer may be assumed to be inversely proportional to the square root of the distribution density of dwellings. Consequently, based on the four trial areas, and at the 1939 price level, the rural electrification of the 26 counties is estimated to require £17 millions for 402,750 dwellings. To serve them all some 75,000 miles of 10,000-V lines with something like 100,000 transformers will have to be provided.

The magnitude of the scheme may be gauged from the fact that the 3,840 miles of existing lines have been erected in sixteen years. During the initial period of development contractors built the original network at the rate of 650 miles per annum, whereas the E.S.B. has since built some 380 miles of lines annually.

By comparison with the extent and cost of the distribution system involved, the quantity of electricity needed to serve the rural consumers will be relatively small ; an outside figure with well developed usage, would be of the order of 500 kWh per consumer annually over the country as a whole, which means 200 million kWh for the whole rural community of about 400,000 families. In 1941–42 the E.S.B. sold 360 million kWh to 200,000 consumers, the capital invested in the whole system (including the power stations) approximating to £16 millions.

Organisation and Management

The second part of the report briefly reviews rural development in nine other countries, while the third section is concerned with the service to be rendered in Eire. Its organisation and management are discussed on the presumption that the E.S.B. will administer the scheme. Thus technical management should be entrusted to the same staff (the Board's present area "electricians," who attend to operation, maintenance and repairs) who are said to be naturally suited to undertake the same work in the country as they are now doing in urban districts. The non-technical requirements of meter reading, furnishing accounts and collecting money differ in that they involve the coverage of much ground in regularly visiting the premises of consumers, the distribution density of 15 dwellings to the square mile comparing with 100 in villages and 15,000 in towns. It is therefore proposed that this work be done by meter reader-collectors, who at present do similar urban work, the meters to be read only three times per annum.

The report anticipates that in farm households proper there is likely to be a much more extensive demand for electric labour-saving devices than is experienced in cities, because of the onerous nature of the work of farmers' wives who, in addition to housework, have many farm duties to perform.

* P.6530, Government Publications Sale Office, 3, College Street, Dublin, price 5s.

The fundamental peculiarity of farming in Eire is the very small extent to which it is concerned with tillage, in particular with corn crops. The production and handling of cereals represents labour in Denmark, Sweden and Germany out of all proportion to that which it does in Eire. It is accordingly not surprising that, as indicated in an appendix to the report, much greater mechanisation prevails in other countries where threshing and handling straw and grain account for the major demand for power.

Survey of Applications

Other appendices contain the results of an analysis of motive power requirements for the preparation of food for animals and of heat for cooking food for pigs, and indicate what an asset electricity is to dairying operations, poultry raising and egg production. There are also estimates of water requirements on farms of different sizes with statements of probable power consumption for pumping and its cost.

It is stressed that considerable research will be necessary to evolve properly designed and reasonably dimensioned farm machines for use in Eire. Motor drives make it feasible to design farmyard appliances of smaller, lighter and more compact construction than those now operated by hand or oil engines.

The fourth section of the report deals with the financial aspects of the scheme, estimation of the annual costs of supplying electricity and the manner of calculating the cost of energy fed into the network. More appendices indicate that the cost of delivering energy from the present 10-kV distribution lines averages 0·82d. per kWh, which is made up of a fixed charge of £8·63 per kW with a running cost of 0·135d. per kWh, plus 11 per cent. in respect of general administration.

To correspond with that break-up of cost it is proposed that the rates to be charged for electricity in rural areas should likewise consist of two main elements. It is considered that any policy other than that of uniform charges throughout country districts would occasion so much opposition and difficulty in Eire as to be practically unworkable. It is stated that running charges of 2d. per kWh below and 0·75d. per kWh above 600 kWh per year would suffice for ordinary requirements, it being unwise to quote too low prices at the beginning which would be difficult to raise later on.

Basis of Fixed Charge

To the schedule there would be attached a table of fixed annual charges per consumer based on the floor area of the dwelling and out-offices. Only one-half the area of such out-offices as stable, barn, byre, etc., would be taken into calculation in the case of farm dwellings. The fixed portion of the two-part tariff would correspond with the fixed element of the E.S.B. annual cost, its scale and method of determination being discussed at greater length than other aspects of the report. The scale of fixed charges applicable to the present rural areas of the E.S.B. range from 4s. 4d. (per two-monthly period) for less than 400 sq. ft. up to 43s. 4d. for between 6,000 and 10,000 sq. ft. of floor area.

As the imposition of a higher scale of fixed charges is not considered to be feasible, the conclusion is that with the degree of development achieved in five years in the trial areas (69 per cent. of dwellings connected) the return to be reckoned on will not be greater than 9·7 per cent. whereas it is estimated that a gross return of 12 per cent. will be needed to avoid a deficiency. A greater return can only be obtained by exercising some degree of selectivity in the premises to which energy will be offered.

The relatively small monetary return which the large capital investment could yield has in other countries led to the provision of State subsidies. This aspect of the scheme will need to be clarified before any progress in planning and organisation on a national scale can be made in Eire.

Press Views

A Bill to give effect to the report is expected during the next session of Dail Eireann.

The *Irish Press* (which supports the Government) praises the admirably clear and practical nature of the report. It says that the chief advantage to be looked for is a great increase in agricultural production. The *Irish Independent* (Opposition) expects that the capital expenditure may be a good deal more than £17,000,000 as probably prices in the post-war years will be in excess of the 1939 level. As the rural community constitutes more than 58 per cent. of the entire population, and the rural areas are to be supplied by extensions of the existing network, the latter must be gradually effected and the newspaper says "it may take ten years or longer before the scheme is completed."

The *Irish Times* considers it to be axiomatic that Irish rural electrification is essential to progress. It declares the scheme to be "ambitious and expensive," adding, however, that "nevertheless the work must be undertaken sooner or later and the sooner the better." It is "apparently too much to expect" that a scheme of such magnitude will be self-supporting and clearly some part of the burden must be borne by the State. The journal stresses the fact that the existing sources of power could not possibly bear the added strain that the contemplated scheme will throw on them. Simultaneously with the creation of its new network the E.S.B. "must make all speed with the harnessing of other Irish rivers in addition to the Shannon and the Liffey." This is the view taken in engineering circles generally.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Power-Station Sites

MOST of the letter by Mr. William C. Kennett in your issue of August 18th seems sound commonsense and one is bound to agree that electrical engineers alone are qualified to deal with the technical considerations bound up with the choice of a site for a power station, but in regard to his suggestion that the high level of education of electrical engineers will also ensure consideration of what is culturally right and fitting, some electricity supply engineers, and many others in close contact with them, will realise that this statement is nonsense.

As regards the further suggestion that if they feel it desirable they can always consult others professionally qualified, such as artists or architects, are they likely to feel it desirable?

Portsmouth. A. C. STEPHENS.

Trunk-Road Lighting

APROPOS of the article by Mr. F. H. Pulvermacher in your issue of August 25th, I suggest that the series constant-current system of supply is worthy of consideration. The circuit would be a single loop, it might have one limb on each side of the road with branches along lateral roads if required.

The outstanding advantages of this series constant-current arrangement are:—All the lamps would have the right voltage; the farthest would be as bright as the nearest. Voltage drop being thus eliminated from attention, the choice of conductor would be made on economic and constructive considerations. All switching would be done at the point of supply, no switching conductor being needed. Since the current would be determined from economic data, the windings of the transformers at the lamp positions would be calculated to give the required lamp voltage with that current in the primary; transformer windings could thus be standardised for each type of lamp and lateral branches could be taken along the two sides of the streets.

The only essential protective item would be a volt-actuated cut-out to short-circuit the primary if a failure of the lamp opened the secondary circuit. This might be a simple film or foil cut-out, but other forms are available. The position of the "resultant fault" due to normal leakance of the circuit could be indicated permanently by a pair of electrostatic voltmeters between each supply terminal and earth; a real fault would be located by the relative readings, and its magnitude could be determined by observing the current through an ammeter in the earth connection at the supply point. The limitation to the number of lamps to be supplied on one circuit would be the permissible voltage because every lamp would add a definite P.D. to the loop.

No novelty is claimed for the suggestion; the earliest street lighting was done by arc lamps on constant-current series circuits, DC, for the Brush and Thomson-Houston, and AC for Jablochkoff and Siemens lamps. I have a notion, which I cannot check, that some street lighting in United States towns has been converted from DC to AC with transformers at the lamp positions, and high-power filament lamps in place of the arcs.

The Gaulard-Gibbs system as installed at the Grosvenor Gallery was a perfect anticipation, the transformer primaries were all in series. That did not answer requirements, for the constant primary current could not furnish a variable secondary load at constant voltage, but it was quite satisfactory for the supply of a constant secondary load.

Stroud. H. M. SAYERS.

Post-war Street Lighting

IN view of the prospects of an early termination of hostilities in Europe, a problem of No. 1 anxiety to local authorities is the restoration of public lighting. During the past five years of black-out, considerable deterioration of street lighting equipment including poles, suspension wires and fittings has taken place, and particularly in view of unavoidable arrears of maintenance much of the equipment in connection with the older installations needs replacement.

The situation as regards early restoration of lighting in many situations is pretty hopeless on account of the ban upon expenditure, the inability to obtain permits for the release of materials, the shortage of labour and the general shortage of stocks of street lighting apparatus and fittings.

A comparison of black-out street accidents with the number of air-raid casualties should balance our opinions upon the general question of matters of security and, apart from the question of public amenities, emphasise the importance of street lighting as a security measure. This may be somewhat difficult, however, since the Press has been very quiet about black-out accidents since 1940, when facts and figures of a highly disturbing nature were frequently published.

I feel sure that there will be general disappointment that a recent circular of the Ministry of Home Security has given no

hint of practical help in the way of releasing either materials, labour, or funds for this important work. The public is highly expectant of an early resumption of street lighting, and even now petitions are coming in for something to be done. Unless some of the present restrictions are removed, it will be a long time after the armistice before lighting can be restored on many sections of road, and it is to be hoped that judicial bodies will correctly assess the responsibility for future accidents which will be inevitable on unlighted highways.

It is therefore suggested that the Association of Public Lighting Engineers, the Electrical Development Association, the Incorporated Municipal Electrical Association, the Association of Municipal Corporations and all other bodies concerned should make representations to the appropriate Government Departments with a view to release from all those restrictions which are at present preventing local authorities from carrying out essential preparations for the resumption of all pre-war street lighting.

Swinton. H. C. BUSBRIDGE,
Borough Electrical Engineer.

Control Systems

THE subject of relays and time-switch control should be approached from the point of view, not of an individual's bias for one system as against another, but of what the supply undertaking is endeavouring to achieve. There is no doubt that a supply undertaking does know to within reasonable commercial limits what are and what are not its normal peak periods, but a system of centralised control by means of tuned relays gives the undertaking the flexibility it should have to deal with the sudden contingencies brought on, say, by the vagaries of our climate.

The electrically driven time switch has its uses, and will no doubt continue to be used in its many spheres of application. Floodlighting, shop window lighting, street lighting, etc., are basically linked to a previously calculable time-table, but when one adds to all this domestic water heating, etc., the desirable feature of flexibility takes shape. Loads can be divided into essential and non-essential ones and be accordingly remote-controlled by the supply undertaking.

Such control leads to a lower tariff, because the valleys in the load curves are filled up and the undertaking becomes more electrically efficient. The question of capital costs has been dealt with, but from the point of view of maintenance it seems there cannot be much in the two schemes, and if the remote-controlled scheme does have higher maintenance and capital costs, these should be far outweighed by its apparent advantages. After all, the tuned-relay scheme is well tried and efficient, and I feel sure it will be favoured as there are several important applications for it within the supply industry.

Ealing. V. E. COELHO.

WITH reference to Mr. Leslie C. Sharp's letter, published in your issue of August 25th, his mention of a "story" suggests that he suspects me of being associated with a manufacturer. My writing of this or any other article was neither prompted by nor assisted by any manufacturer. Rather was it, as he rightly says, although I had not aspired to so high a plane, that I felt I had a mission to the industry. And why not? After all, as he also rightly says, progress is inevitable and if after several years' experience with a centrally controlled superimposed current system I can sense progress, then why not spread the news for the good of all concerned? As to wishful thinking—we shall see, before many years are passed.

This flexibility, which I object to being called a bogy, is very real. Mr. Sharp wanders away over the fields of street lighting, floodlighting, etc., whilst I only claim overriding importance for it in connection with control of restricted-hour loads. I think it is generally agreed that restriction on the use of electricity is opposed to progress, but that some restriction as to times of use must apply to energy purchased by a consumer, if he elects to be charged at a specially low rate. The consumer, although he adopts the conditions, is annoyed by them and sooner or later wishes they could be relaxed. With time-switch control that restriction is permanent but with a remotely controlled relay it need not be so. In the latter case, *progress* towards the ideal of unlimited supply is taken to its logical conclusion, that some day neither time switch nor relay will be required. Who will be dissatisfied then?

Next, I do not *suggest* that three switching operations a day present difficulties to a time switch. I state facts which are backed with confidence born of experience. I did not claim any dimensional advantage; the relay is as weatherproof as a time switch. Neither did I imply that existing distributors can be disinterred, switch wires added and be re-instated at 1s. per yard. I was briefly discussing substation control *versus* individual column control, even going so far as to agree that time-switch control is equally applicable. Incidentally, the more difficult conditions envisaged by Mr. Sharp are also easily managed by a relay.

We come now to maintenance. Not being associated with manufacturers, who may be led to make theoretical conjectures about maintenance costs, but instead, being associated with an authority which uses both time switches and relays, I can state that in my experience relay-maintenance cost

is less than that of hand-wound and electrically wound time switches. I would refer Mr. Sharp to Mr. J. L. Carr's recent I.E.E. paper entitled " Remote Switching by Superimposed Currents," Table I, where detailed comparative figures are given from another source for time switch and relay costs. Regarding Mr. Sharp's reference to " flexible popping in and out," a relay is merely " popped in "—it rarely needs to be " popped out."

Mr. Sharp allows me at least the point concerning consumption, although I misled him (sorry !) only slightly in detail, because he finally realised what was intended, *i.e.*, synchronous motor-driven switches instead of electrically wound ones. Finally, not one day there may be, but to-day there is, something in this system of control by superimposed current, which has several advantages over time switches.

In regard to Mr. J. C. Beard's criticism, it is true that I did not mention the cost of the transmitting equipment, but neither did I state the cost of first-class time switches. In any case an increase in cost per piece of control apparatus makes my point even more strong, *i.e.*, block control is advantageous financially. There are, I know, other factors to be considered. Mr. J. L. Carr's paper, mentioned above, gave detailed comparative costs.

The floor space question had never struck me as being so very important, but in the *Electrical Review* of August 6th, 1943 (p. 167), a photograph of the major portion of a transmitting equipment is reproduced, the whole apparatus being housed in a space approximately 20 by 12 ft.

Lastly, his plea for more service to the consumer echoes my own sentiments. As I have stated above, I am all for removing, if only by stages, the restriction imposed on consumers who choose the very cheap rate with its accompanying penalties.

Bedford. S. A. DAINES.

Registration of Contractors

WRITING on this subject in your issue of July 14th, Mr. F. Cooper blamed householders for a lot of dangerous extensions to their electrical installations. I am doubtful if this is the main cause of complaint. Most of it is due to partly trained wiremen and lack of adequate supervision, chiefly in works, Government Departments, and electricity supply authorities. I have seen very bad work carried out on military establishments, N.F.S. premises, and local government premises, which in many cases has been the work of men who were half mechanics, half electricians. Some electrical contractors, too, do not maintain sufficient supervision, and I have seen bad work here. Also, some supply departments have allowed items like ordinary inspection fittings in conduit containing v.i.r. cables outside, exposed to the weather, and in a urinal an electricity meter within easy reach, not earthed. One could fill a volume citing faulty work.

A more general insistence on regulations being carried out, more detailed inspection by the factory inspectors and insurance companies, and greater attention to the supervision of the men while carrying out work would considerably improve electrical installations over the next ten years. Any firm or person carrying out electrical work should be registered.

Electricity supply authorities could quite easily include a note with their bills advising the public not to allow their installations to be extended or repaired by other than a fully competent person. Where the authorities have their own wiring departments in competition with the electrical contractors, they should be as unbiased as possible.

Walsall. H. F. TRUMAN.
(E.C.A., N.R.E.I.C.)

Power Supply in Brazil

IN your issue of July 28th you publish a report entitled " Power Supply in Brazil." The first two paragraphs are reasonably accurate, but in the third the erroneous statement is made that the height of the dam at the *Serra* hydro-electric plant has been doubled. We are afraid the writer has confused matters as it is the Lages dam serving the Rio system which has been increased in height, not the Serra, which serves the City of Sao Paulo system.

There is a further statement in this paragraph, *i.e.*, that the application for a permit for the acquisition of an additional 67,000 kW turbine and generator at the Serra plant has not been finally passed ; although this may have been the situation at the time the article was written, it was not strictly correct on the date of publication, as by then the priority permit for the above plant had as a matter of fact been granted.

Hove. E. A. REID
(Canadian & General Finance Co., Ltd.)

Freedom of Choice

YOUR correspondent, Mr. Adcock, in his letter to you last week, puts to me the question as to whether I think consumers will be satisfied with gas lighting and willingly go without such conveniences as electric irons, mains radio, vacuum cleaners, etc. To this I would put a counter-question, *viz.* :—" Are the public going to be satisfied with prefabricated (tabloid) dwellings as well as the many other inconveniences of internal equipment ? " Of course they are not, but it all comes down to a question of £ s. d., and they will have either to put up with it or pay the cost, unless the State, that is every-

body, including Mr. Adcock and myself, assist by way of subsidy.

To specifically answer Mr. Adcock's question: doubtless many will not be satisfied, but what they may lose in convenience they will gain financially, and in any case I have yet to meet the person who is satisfied with everything in life. If the consumer is satisfied to use electricity only for the conveniences named by Mr. Adcock, he must be equally satisfied to pay the price for them and not keep on shouting for cheap electricity.

It is idle for Mr. Adcock to argue that if the gas companies and municipalities provide all the piping and appliances free of charge, the expense will not enter into the matter. How childish! How are the gas undertakings to be recouped except by the charges they make to the consumer? Whether it be electricity, gas or water, it is the consumer who pays and no one else. The charges to the consumer can only be reduced to the minimum by obtaining a maximum revenue per consumer, and this necessitates the avoidance of dual or triple services, with all the additional cost entailed thereby.

*London, W.C.*2. F. W. PURSE.

Cheapening Electricity

WITH reference to your comments under the above heading in your issue of September 1st, may I suggest that it is high time for an official and emphatic correction of the popular superstition (probably dating from 1926) that electricity "costs" only a very small fraction of a penny per kWh and that it can, therefore, be economically supplied for all domestic purposes, including unrestricted space heating, at a price of ½d. per kWh or even less. What are the facts? With generating costs of only 45s. per kW and ·27d. per kWh including coal (grid tariff payers are requested not to laugh!), a load factor of over 34 per cent. is needed to give a combined cost of ·45d. per kWh generated or, assuming 10 per cent. losses, ½d. per kWh delivered to the consumer. This represents the cost of energy alone and makes no allowance whatever for capital or maintenance charges on the transmission and distribution systems required.

An enormous expansion in domestic consumption is certain within the next few years and, in particular, hundreds of thousands of kilowatts of additional space-heating will be connected as soon as the present restrictions on the manufacture of apparatus and on the acceptance of additional loads are removed. Much of this space-heating will be installed by consumers already on two-part domestic tariffs whose standing charges will not be increased. Thus only the running charge will be available to meet the cost of supplying much of this additional energy and, more important, of meeting the additional kilowatt demand. Bearing in mind the probable load factor the position becomes absurd and when the undertaking's other consumers become tired of paying the required subsidy a general increase will be inevitable. Would it not be better to adjust tariffs before this additional heating is connected?

One fairly equitable solution would be to raise the "unit" rate on the two-part tariff to, say, 1d. and then to give generous quarterly rebates to consumers who use electricity for cooking, water heating, refrigeration and any other load which it is especially desirable to encourage. The rebate would take the form of a reduced price for a quarterly block of units depending on the size of apparatus installed, but if the total consumption was less than the block allowed the rebate for that quarter would be correspondingly reduced. No extra metering would be needed and the unit allowances could be estimated generously.

I suggest that a tariff on these lines (whether a block tariff or with a standing charge based on rateable value or size of premises) if adapted in detail to suit local costs and load conditions, could be applied to the general domestic load throughout the country with advantage to all concerned. A consumer with electric cooking, water heating, etc., would fare extremely well, but one who had some other fuel for cooking and used most of his electricity for space-heating at a bad load factor would at least pay more than at present.

In this connection it must be remembered that for short-period heating purposes electricity at 1d. is quite competitive in cost with any alternative fuel, apart from its many other advantages. On the other hand, even ½d. per kWh is too expensive for the *average* consumer to afford to use only electricity for his basic heating in the winter and he must —at the present stage of technical development—use solid fuel for this purpose, notwithstanding its disadvantages.

*London, W.*1. A. M. HARKER,
General Manager and Secretary,
Electric Supply Corporation, Ltd.

Giant Wind Tunnel

WHAT is claimed to be the largest wind tunnel ever constructed was put into service in June at the Ames Aeronautical Laboratory, Moffett Field, California. It is rectangular in section and two-fifths of a mile long. There are two batteries of three 6,000-HP motors, giving a total power of 36,000 HP, and the supply for these is taken from a 110-kV power line and stepped down to 6·5 kV. Through application of the modified Kraemer control system the starting and stopping of the motors is effected merely by pressing a button. The methods of control are such that the large motors are run up to the desired speed with the minimum disturbance to the power system.

PERSONAL and SOCIAL

News of Men and Women of the Industry

A LARGE company of staff and employees of the Great Yarmouth Electricity Department gathered on August 26th, to bid goodbye to the retiring chief engineer and manager, **Mr. P. E. Rycroft.** Councillor Docwra was present as chairman, and Mr. F. B. Bell, who made the presentation of an electric clock with Westminster chimes, spoke of the years that Mr. Rycroft had been associated with the Department, of his ability as a manager and of his courtesy and understanding in dealing with problems which arose. Mr. Rycroft in his reply compared the Great Yarmouth undertaking to a happy ship with a crew that worked well together. He appreciated the support he had received from everybody present through very troublous times, and in introducing his successor, Mr. G. T. Allcock, he bespoke for him similar support. Mr. Rycroft was afterwards entertained to lunch.

The many friends of **Mr. W. E. Bush** will be glad to learn that after many vicissitudes he and Mrs. Bush and their daughter Maxi recently arrived back in this country. It will be remembered that Mr. Bush, formerly manager of the Lighting Service Bureau, who was European manager for the Curtis Lighting Corporation, with headquarters in Paris, was interned by the Germans in 1940 when they over-ran France.

The award of the B.E.M. to **Mr. Hildred Bastow,** an electrician, of Meltham, near Huddersfield, is announced in the *London Gazette*. A large part of the works where he was on duty was flooded as the result of a cloudburst, and 10,000-V switches were threatened by the flood. Without hesitation Mr. Bastow made his way through the floating wreckage to the switch room and pulled the three high-voltage switches. He then went another 70 yards through the flood wreckage and pulled the subsidiary switches. He was in considerable danger while making the disconnection, the citation reads, and set an outstanding example of courage and devotion to duty. The *Manchester Guardian* reports that, according to an official of the firm, Mr. Bastow dived through 6 ft. of water deep with slime to reach the switches.

Sheffield Electricity Committee has recommended the promotion of **Mr. H. Price**, assistant station superintendent at Blackburn Meadows, to fill the position of station superintendent at Neepsend rendered vacant by the retirement of **Mr. A. S. Frost.** To fill Mr. Price's place the appointment of **Mr. L. A. Fosbrooke,** boiler superintendent with the London Power Company, is recommended.

Mr. Henry Bay has resigned from the board of the Franco-British Electrical Co., Ltd.

It is reported by *Reuter* from New Delhi that the Government of India has engaged **Mr. William L. Voorduin,** an American hydraulic engineer, to be mainly responsible for advising the Government in connection with hydro-electric planning and the investigation of potential hydro-electric resources. This is regarded as the first step towards the formation of a Central Technical Power Board, which is now under consideration. Mr. Voorduin has for the past ten years been head of the Project Planning Division of the Tennessee Valley Authority.

After forty-four years' service in connection with passenger transport **Mr. Reginald S. Good,** divisional electrical engineer, London Passenger Transport Board, will be retiring at the end of this month.

Mr. A. C. Thirtle, A.M.Inst.C.E., A.M.I.E.E., deputy chief engineer of the Swansea Electricity Department, has been appointed city electrical engineer of Carlisle in succession to **Mr. C. W. Salt,** who is retiring. Mr. Thirtle who takes up his duties on October 1st, was an articled pupil of the late Mr. F. M. Long, M.I.E.E., and after holding various appointments in the Norwich Electricity Department, was engaged in the development of the Thorpe power station, a base load selected station of the Central Electricity Board, South East England Area. He was engaged in the commissioning of the station, which had been designed by Preece, Cardew & Rider, and was responsible to the city electrical engineer for various extensions. During 1935-36 he was resident engineer in charge of the installation of the 30,000-kW extension operating at 675 lb. per sq. in. pressure and 875 deg. F., steam. From 1936 until going to Swansea in January, 1940, Mr. Thirtle held the appointment of generation engineer at Norwich and for three years was a lecturer on generation, distribution and utilisation of electricity at Norwich Technical College. He has been engaged in many activities in connection with the industry and he served as chairman of the No. 8 Area of the District Joint Board of Employers and Members of Staff.

Mr. A. C. Thirtle

Obituary

Mr. J. G. Crozier, managing director of Richard Johnson & Nephew, Ltd., died on August 27th at the age of fifty-six. After qualifying as an accountant he took up an appointment in Rangoon which position he vacated in order to join the Board of Inland Revenue. In 1919 he was appointed secretary to Richard Johnson & Nephew, Ltd., and was made a director in 1928. Subsequently he became joint and finally sole managing director. Mr. Crozier was keenly interested in education and was a member of the Manchester University Appointments Board and till recently one of the governors of Manchester High School for Girls.

Mr. F. C. Edgar.—The death occurred recently of Mr. Frank C. Edgar who for many years carried on business as an electrical engineer at Halifax, and was a member of the Electrical Contractors' Association. He was fifty-seven.

COMMERCE and INDUSTRY

Contractors' Showrooms. Cable-making Film.

Engineers' Wage Claim

AN immediate advance of 10s. a week on the basic rate to adult male workers is being claimed by the Amalgamated Engineering Union. The National Committee of the A.E.U. in Edinburgh in June decided to ask the executive to seek the approval of the National Joint Engineering Trades Movement for the claim. The Press Association Labour Correspondent reports that the proposal was to be considered at a meeting at York on September 7th.

Scottish Electricians' Pay Increase

As from September 25th electricians engaged in contracting in Scotland are to receive an advance of 1d. per hour, raising their pay to 2s. 1d. per hour; second, third, and fourth year apprentices will receive an advance of ½d. per hour. The increases have been negotiated between the Electrical Contractors' Association of Scotland and the E.T.U. and will affect about 4,000 workers.

Proposed Joint Showrooms

The Cardiff Branch of the Electrical Contractors' Association has discussed the setting up of a joint showroom by members and has agreed the following points:—That it would be preferable for each branch to act individually; that the members of the Cardiff Branch should form a limited liability company for the retail sale of all electrical appliances; that a showroom should be opened in the centre of the city; and that a competent manager with a thorough knowledge of the trade should be employed.

Other proposals were that there should be a limit to the number of ordinary shares held by members; that there should be 7½ per cent. preference shares of an equal amount to the ordinary shares; and that members of other branches should be allowed to subscribe. Bulk buying was also discussed.

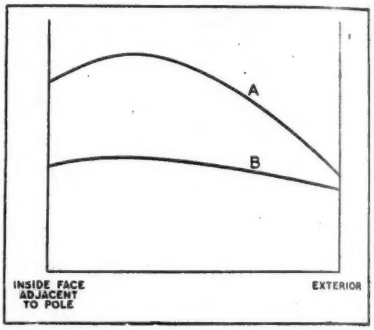
The subject, together with collective buying, was also debated recently by the West Yorkshire Branch of the E.C.A. and a special meeting is to be held to go further into the matter of joint showrooms.

Field-Coil Temperatures

A notable advance in recent manufacturing technique of DC motors and generators has been the great reduction made in temperature gradient between the inner face of the field coil adjacent to the pole and its exterior.

Whereas a two to one ratio of hot-spot to ambient temperature was previously not uncommon, the accompanying diagram, which compares this condition with that of a present-day Crompton-Parkinson machine, shows a temperature gradient through the coil to be almost non-existent. While this improvement does not increase normal output, it raises the factor of safety, which is largely determined by hot-spot temperature. The ability to withstand sustained overload is, however, thereby increased and this quality is aided by the class of oil-bound synthetic-resin varnish now available for impregnation.

These new field coils have been designed with especial regard to robustness and high resistance to humid, oily and chemically charged atmospheres. They have been subjected to lengthy



Temperature gradient in shunt field coils
A. Typical former coil. B. Modern coil.

type tests in (artificial) tropical conditions and have stood up to high-voltage and insulation resistance tests taken at regular intervals during heating and cooling cycles imposed by passing current through the coils for several months.

Long-Service Aluminium Busbars

Thirty years ago the s.s. *Aquitania* (Cunard White Star, Ltd.) was equipped with an electrical installation including what was then an innovation, aluminium busbars. This installation is still in service and some notes on the busbars have been sent us by the British Aluminium Co., Ltd.

The main switchboard, working at 220 V DC, consists of three 5 in. by ½ in. bars in parallel 39 ft. 6 in. long and a similar circuit 43 ft. 6 in. long; there are also fourteen auxiliary switchboards in various parts of the vessel, equipped with 2 in. by ⅜ in. aluminium bars.

The load per three bars varies between 3,000 and 4,000 A. This rating is conservative as the current for a 40 deg. C temperature rise is about 5,800 A and the ambient air temperature is higher than in a normal power station. Actually it has been found to vary between about 32 and 49 deg. C.

The bars are joined by bolting them to interleaving 6 in. lengths. Tappings are by copper stems passing through the bars and clamped by brass nuts. Brass bolts and nuts are used for all joints. There is no paint or protection on any of the bars but they are kept highly polished. About 1920 the joints in the main bars were examined and found to be in perfect contact no deposit showing. Further examinations at five yearly intervals confirmed the above finding. When first examined about 1920 a deposit was found on the faces of the aluminium connecting

straps from the generators to the board. This was corrected and on subsequent examination they were found to be in perfect condition.

Occasionally slight deterioration had been noted at the copper-aluminium contacts on the auxiliary boards. It is highly probable that vaseline would have averted the trouble. After cleaning and re-securing the joints no further trouble was noted.

Electric Cable Film

To emphasise the importance of electric cables and wires in all spheres of domestic and industrial life the British Council has produced, with the co-operation of the Insulated Conductors Export Group, a documentary film entitled "Power Lines." Though it is intended primarily for overseas exhibition it is of general instructional interest. Besides indicating the present-day indispensability of electric wires and cables, the film traces their construction right from the refining of the copper for the conductors to the armouring and the testing of the completed product.

Army Signals Exhibition

At an exhibition of Army Signals now being held at Charing Cross Underground Station several of the latest field wireless sets are shown, including one complete station in a handcart as used on the beaches in Normandy. A working exhibit is a high-speed apparatus—perforator, transmitter, re-perforator, undulator and page-printer—as used on the wireless links from the War Office to all theatres of war, and the public can operate a wireless training set used to accustom the operator to read morse through typical interference. Other exhibits include Army lines and line transmission equipment and diagrams showing the chain of communication in an armoured division, which has approximately 1,500 wireless sets.

E.A.W. Helps E.I.B.A.

The Halifax and District Branch of the Electrical Association for Women has handed over to the West Yorkshire E.I.B.A. Committee the sum of £13 3s. 8d. being the proceeds of a bridge and whist drive at the home of Mr. and Mrs. A. G. Connell. The function was also a great success socially and the Mayor and Mayoress of Halifax were present.

Post-war Radio Sets

A statement issued by the British Radio Equipment Manufacturers' Association says that whilst production for civilian purposes may be expected to begin shortly after the war, some time must elapse before pre-war output is achieved. More than 3,000,000 homes need new radio sets and equipping them all again will take a considerable time. The 250,000 standard sets being produced this year are competently designed receivers with a very efficient performance.

Electrified Garden Fence

Ferdinand Carlos De Paeztron, who was stated to have electrified his garden fence and caused three people to receive shocks, was fined £15 by the Birmingham Stipendiary last week for assault. Mr. J. Ross, prosecuting, said that in September, 1941, Paeztron was fined £10 for causing grievious bodily harm to a five-year old boy by similar means. Mr. Ross added that neighbours had received severe shocks from the fence which was connected to a domestic meter. When spoken to by a neighbour Paeztron threatened to put 500 volts through the fence.

Det.-Sgt. Quinton said that the fence was directly accessible to children and babies crawling on neighbouring lawns. The only reason why there had been no serious accident was that neighbours knew the fence was electrified. Paeztron said that people used to climb into his garden and steal his crops and he did it to stop them.

Electrical Accident Prevention

A paper presented at a recent Nuffield Safety Conference by Mr. A. E. Bullock (S.U. Carburetter Co.) reviewed the causes of electrical accidents in factories and their prevention. It gave statistics based on reports by Electrical Inspectors of Factories and a résumé of the regulations governing the installation and use of electricity in industrial works.

Mr. Bullock emphasised the importance of the term "authorised person" used in the regulations and expressed the opinion that this country should follow the practice adopted in other parts of the Empire of licensing electricians, with provision for the annual renewal of licences.

Repair of American Equipment

The August issue of the *Production and Engineering Bulletin* publishes a reminder from the Machine Tool Control of the existence of a repair and maintenance service for the motors and control gear fitted to the many American machine tools now in operation in this country. The work is carried out by a firm acting as agents for the Director of Industrial Electrical Equipment. This firm holds stocks of essential spares, such as contacts, springs, coils, overloads and mouldings, and can not only carry out the repair of starters but often provide a complete replacement if necessary. Full information can be obtained from the D.I.E.E., Machine Tool Control, Ministry of Supply (Code VA), 2, Old Queen Street, S.W.1 (telephone: Victoria 9040).

Institute of Metals

The thirty-sixth annual autumn meeting of the Institute of Metals is to be held at the James Watt Memorial Institute, Great Charles Street, Birmingham, on Wednesday, September 20th, at 2.15 p.m. After the formal business there will be a discussion on the melting and casting of bronze, based on papers which have recently appeared in the *Journal* of the Institute.

Prospects in Canada

We have received from the Hamilton Bridge Co., Ltd., Hamilton, Ontario, a 20-page survey of conditions and prospects in Canada produced for the information of British manufacturers. Its avowed aims are to show why it is advantageous to arrange now for the manufacture of metal goods in Canada and what particular advantages are offered for the manufacture of these goods in the company's plant.

Particulars are given of Canada's national income, exports, domestic market, water

power and mineral resources. The importance and advantages of Hamilton as an industrial centre are stressed and the company's facilities are dealt with. A list of equipment made by the company indicates a very wide scope. Copies of the survey are obtainable from the Canadian Government Trade Commissioner, Canada House, S.W.1, the Canadian Chamber of Commerce, 3, Regent Street, S.W.1, or Mr. I. S. P. Armstrong, Agent-General, Ontario House, 13, Charles II Street, S.W.1.

Revised Purchase Tax Notice

Notice No. 78, the main public notice relating to the liability of goods to Purchase Tax, has been revised. The new edition supersedes that published in September, 1942, Notice No. 81A published in April, 1943, and all Press notices issued prior to July 1st, 1944, relating to the liability of goods other than young children's clothing and goods in Classes 19, 20 and 21.

In the course of the next few days copies of the notice will be posted to all traders registered for Purchase Tax purposes. Other persons interested may obtain copies from local Officers of Customs and Excise or from the Secretaries' Office, Customs and Excise, City Gate House, Finsbury Square, E.C.2.

Postponement of Joint Conference

The Organising Committee has decided to postpone the Joint Conference of the Institution of Chemical Engineers, the Institute of Physics and the Chemical Engineering Group (Society of Chemical Industry) on " Instruments for the Automatic Controlling and Recording of Chemical and Other Processes," which was to have been held in London on September 22nd and 23rd. The new date for the Conference will be announced in due course.

Gauge and Tool Makers

The Export Committee of the Gauge and Tool Makers' Association has concluded arrangements with a large number of Empire, Dominion and foreign Governments under which the Association will be notified of any trade delegations coming from those countries to Great Britain. This will enable the Committee to give receptions to such delegations and arrange for their itineraries to include visits to member-firms' factories, with the primary object of promoting goodwill between British manufacturers and potential and existing customers overseas and of developing the post-war export of British tools and gauges, jigs and fixtures, moulds and dies, etc. The annual general meeting of the Association has been fixed for Wednesday, November 1st.

Industrialisation of India

Post-war industrialisation of India was discussed by Sir Ramaswami Mudaliar at a recent meeting of the Andhra Chamber of Commerce. He said that in seven or eight years the country would have as much electric power as it needed for such industrialisation. The Government of India was paying special attention to hydro-electric development and expected a 50 per cent. increase in the present total supply of electric power within the next two or three years.

With regard to coal production, he felt sure that within the next four years this would increase by ten million tons over the pre-war output. The Government of India had deputed a special officer to the United Kingdom and the United States, and it was hoped that machinery for coal mining would be available early next year.

Trade Publications

Siemens Electric Lamps & Supplies, Ltd., 38, Upper Thames Street, London, E.C.4.—Revised emergency lamp list (No. 975), priced.

British Insulated Cables, Ltd., Prescot, Lancs. —Illustrated leaflet (NSG.9) dealing with soft solders, flux-cored solders, fluxes and pastes.

Runbaken Electrical Products, 71, Oxford Road, Manchester, 1.—Leaflet illustrating mains energised flash test sets for windings and insulation, portable 1,000/2,000 V models.

Copies of these can be obtained from the firms concerned by bona fide trade applicants.

Change of Name

The name of the Concordia Electric Wire Co., Ltd., has been changed to the Concordia Electric Wire & Cable Co., Ltd., to give a better indication of the company's scope.

Trade Announcement

H. M. Walters & Co., Ltd., announce that their range of domestic electrical appliances previously marketed under the name " Diceland" will in future be sold as " Bestfrend."

TRADE MARK APPLICATIONS

THE following applications have been made for trade marks. Objections must be entered within a month from August 30th:—

HOMEPRIDE. No. 629,094, Class 7. Machines (not included in other classes), all for domestic and household use. Also No. 629,095, Class 11. Installations and apparatus for lighting, heating, steam generating, cooking, refrigerating, drying, ventilating, etc.—Steels Electrical Products, Ltd., 4, Dean's Yard, Westminster, London, S.W.1.

MAJESTIC. No. 626,598, Class 9. Electrical instruments and apparatus not included in other classes; measuring instruments and apparatus for electricity and speed; measuring and recording attachments and recording apparatus all for measuring instruments; dimension measuring instruments, etc.; and parts of all the aforementioned goods; electric wire, wireless aerial masts, indicating apparatus and instruments for inspectional control, etc.—The Majestic Electric Co. (1937), Ltd., Majestic Works, Queensway, Ponders End, Middlesex.

ACME. No. 627,310, Class 9. Transformers, reactors and chokes.—British Rola, Ltd., 3 and 4, Clements Inn, London, W.C.2.

DELCO. No. 618,467, Class 11. Electric fans, refrigerators, heating apparatus, boilers (not being parts of machines), air conditioning units and parts thereof not included in other classes, mechanical stokers, current generating and distributing systems, etc.—General Motors Cpn., West Grand Boulevard and Cass Avenue, Detroit, Michigan, U.S.A. Address for service: c/o Stevens, Langner, Parry and Rollinson, 5-9, Quality Court, Chancery Lane, London, W.C.2.

Organisations of the Industry—XII

British Engineers' Association

By J. W. Thomas, B.Sc., LL.B., M.I.E.E.
(Secretary)

THE British Engineers' Association can claim to be one of the oldest of the trade associations in the engineering industry. It was brought into being in September, 1911, when, under the leadership of Mr. Douglas Vickers, M.P., who became the first President, over twenty British engineering firms met together with the common purpose of establishing a representative and strong organisation for the protection of their trade and economic interests. Most of those pioneer firms are still members of the B.E.A. and it is noteworthy that throughout its life the headquarters of the Association have been at 32, Victoria Street, London.

Objects

In those early days engineers were very much concerned about foreign trade and were anxious to establish contacts abroad. In a pamphlet issued when the Association was founded, the objects were described as being the promotion and protection of British manufacturing engineers abroad and particularly in China.

On April 20th, 1912, the newly formed Association was incorporated under the Companies Acts by licence of the Board of Trade, its primary object, as set out in the Memorandum of Association, being:—" To provide a central national organisation in the engineering industry for the promotion and protection of the interests of British Manufacturing Engineers and of British Engineering."

The objects of the Association were drawn with a real understanding of future requirements, as is shown, for example, by the inclusion of a provision for fostering research; they were, however, subject to the overriding provision that the Association should not support with its funds or endeavour to impose on its members any regulation, restriction or condition which, if an object of the Association, would make it a trade union.

It should be made clear, in view of the criticisms which have been levelled recently in some quarters at trade associations, that the B.E.A. does not engage in any restrictive practices: it makes no price agreements, nor does it fix quotas of output.

The B.E.A. is a British organisation catering for British engineering. Its scope is obviously very wide as it has amongst its members manufacturers of such equipment as boilers and boiler house plant, prime movers (gas, oil and steam), cranes, printing machinery, textile machinery, machine tools, steelworks plant, chemical plant and hydraulic machinery. According to the statistics of total insured workpeople published by the Ministry of Labour, in July, 1939, mechanical engineering occupied the fourth highest place with just over three-quarters of a million, the highest being textiles with some quarter of a million more.

For many years the Articles of Association provided that ordinary members must be British manufacturing engineers or shipbuilders or manufacturers of articles accessory thereto, but in 1943 an addition was made to provide for the admission of sectional or specialised trade associations directly or mainly concerned with the engineering industry. This matter is referred to later.

Officers

The Association is governed by an elected Council, one-third retiring annually. Each year the Council elects from its own membership a President: Mr. C. Bentham, M.Inst.C.E., M.I.Mech.E., M.Inst.T., who this year holds office, has throughout his working life been actively connected with the engineering industry, being for many years chairman and managing director of Henry Simon, Ltd., and having interests in such companies as Turbine Gears, Ltd., Henry Simon (Australia), Ltd., Tyresoles, Ltd., and Henry Simon, Ltd. (South America). Mr. Bentham has also been for many years a member of the Management Board of the Engineering and Allied Employers' National Federation.

Presidents who preceded Mr. Bentham were Mr. J. J. Carter, Lt.-Col. Lord Dudley Gordon, D.S.O., Sir William Reavell, Sir Gilbert Vyle, Mr. H. J. Ward, Sir Ernest W. Petter, Mr. Neville G. Gwynne, C.B.E., Colonel O. C. Armstrong, D.S.O., and Sir Wilfrid Stokes, K.B.E.

It is particularly interesting, looking back over the history of the Association, to find among former members of the Governing Council the names of such distinguished

contributors to engineering progress as Lord Riverdale (then Sir Arthur Balfour), Sir Tom Callender, Sir Robert Hadfield, Sir Benjamin Longbottom, Sir William Mather, Sir Charles Parsons and Sir John Thornycroft.

Early Activities

Before and during the last war the Association accomplished a great deal of useful work primarily in relation to foreign trade. It appointed a Commissioner who visited China to look after the interests of members in that country and, during the war itself, the Association maintained close contact with the Government on many matters connected with the engineering industry.

As its activities extended, it became necessary to increase the staff and in 1918 the first Director was appointed in the person of Mr. D. A. Bremner, O.B.E., M.I.Mech.E., M.I.E.E., who had been with the Ministry of Munitions as head of the Aluminium Section. For close on a quarter of a century Mr. Bremner thus served the industry until his retirement in 1943, when the present Director was appointed.

Mr. C. Bentham, President

Much of the history of the B.E.A. centres around the conceptions of Mr. Bremner, who was the active spirit behind many forward movements: he played a most important part in the establishment of the World Power Conference. His name will always be associated with the monthly luncheons organised by the B.E.A. They were addressed either by the Director himself or by prominent men who spoke on current topics of interest and importance to the engineering industry. These functions were greatly appreciated on account of the valuable contacts which they enabled engineers to maintain with one another and were only discontinued in 1940 at the express wish of the Minister of Food.

It is not possible in the space of a short article to make more than passing mention of some of the activities in which the Association was engaged and the tasks it was able to accomplish. In 1924 the B.E.A. organised the Shipbuilding, Marine, Mechanical and General Engineering Section of the Palace of Engineering at the British Empire Exhibition at Wembley. This Section included the products of more than 400 exhibitors and was a noteworthy contribution to the success of this Empire venture. From 1927 the Association, with others, co-operated with the promoters of the Shipping, Engineering and Machinery Exhibition, held biennially in London.

The theme which runs like a thread throughout the Association's history is the necessity for the engineering industry to be more articulate regarding its importance in the community and for its views to be taken seriously into account by the Government.

The Association has striven continually to ensure that when Committees set up by the Government are considering questions affecting industry as much factual information as possible relating to engineering should be placed at their disposal. For example, when in 1925 the Balfour Committee was considering the state of industry and trade the B.E.A. made an important contribution to the evidence by a 70-page report on "The Present Condition and Future Prospects of the Engineering Industry." It was heartening to the then members of the Association to find, when the Balfour Report appeared, high commendation of the clarity and general excellence of the evidence submitted by the B.E.A., to which reference is made in the report as the representative body in the industry. Also, for the Preparatory Committee of the Economic Conference of the League of Nations held at Geneva in 1927, the Association prepared and submitted an authoritative and exhaustive "Monograph on the Economic Situation of the British Engineering Industry." These most valuable documents contained a wealth of statistics and other data concerning the position of the engineering industry at that time and still remain useful works of reference.

Mr. A. W. Berry, Director

Among the many other Committees before which evidence has been submitted on behalf of the engineering industry must be mentioned the Committee of Imperial Defence and the Committee of Civil Research. The latter inquired into the application of protective duties to iron and steel, and it is perhaps of topical interest to mention that among the records of the Association are the minutes of a meeting at which Mr. Winston Churchill, as Chancellor of the Exchequer, appears to have shown great understanding of the problems of the engineering industry represented at that meeting by the B.E.A.

Independently of or in co-operation with other bodies, much valuable work was done on behalf of the engineering industry in connection with rating of machinery, foreign tariffs, subsidies to industry, trade marks and

designs, and geographical distribution of the industrial population.

For many years the President of the B.E.A. was the representative of the engineering industry on the Advisory Council of the President of the Board of Trade, reports being submitted periodically to this Council on the state of the industry. The Association was appointed on behalf of the Import Duties Advisory Committee to examine applications for import licences for machinery, a task carried through from 1932 onwards.

Strength Through Combination

The Association has endeavoured to keep the members informed of changes and developments in regard to both the technical and commercial aspects of trends in engineering progress. The channel through which this was mainly accomplished was the monthly *Bulletin*, first published in 1920. Commencing in a modest way with eight pages of notes of general interest, it was gradually expanded until it comprised 48 pages of worthwhile matter. The paper restrictions made it necessary to discontinue publication in 1940, but last year its revival became possible in the form of *B.E.A.—Information*, issued regularly to members as a wartime measure. This contains matter of technical, commercial and legal interest to members, enabling them to keep abreast of engineering developments and also fully informed of the statutory enactments and Regulations passed from time to time affecting the industry. This service is appreciated highly by the members as a great time saver.

From the earliest years of the B.E.A. the members have sensed the need for a measure of co-operative publicity in overseas territories and the classified handbook of their products with other relevant information has run to some twenty annual editions. From time to time, foreign language editions have been published in, for example, French, Portuguese, Russian and Spanish. It has been found that this comprehensive work forms a most valuable contact with potential overseas purchasers of whom a carefully selected mailing-list has been compiled.

Fortified by more than thirty years' tradition and experience, the services rendered by the Association cover a most extensive field. The routine day-to-day work carried out by the staff assists members in furthering their trading operations and facilitates the transaction of business with buyers overseas. A special department exists for dealing with inquiries received almost daily from abroad from many countries and in many languages. Usually the required information can be given at once, but in other cases it can be obtained quickly through the connections established by the Association and the special facilities available to it. Members are supplied on request with information regarding firms and companies abroad, including particulars of their financial status.

Through most careful study of a very wide range of the foreign technical Press there has been built up a fund of knowledge of trends and facts appertaining to the interests of members, and a separate statistical section is maintained from which very full information on trade and industry generally is available to the members.

Between the wars a great deal of investigational work was carried out in overseas markets and many valuable reports indicating developments and openings for machinery and engineering products of all kinds were prepared. In some cases the services of special B.E.A. commissioners were utilised and it is expected that, when the present conflict is past, the reports on overseas markets will be brought up to date.

It is also worth mentioning that the Association, through its staff, keeps in touch not only with the principal Departments of H.M. Government, the India Office and the Colonial Office, but also with the Dominions' representatives in London and the representatives of foreign Governments.

Problems of To-day and To-morrow

It would now be accepted as axiomatic that there must be the closest co-operation between industry and the Government if maximum national welfare is to be achieved, and the first essential, therefore, is that there should be one strong representative body capable of active and informed collaboration at the engineering industry level.

It has previously been indicated that before 1944 the Association was composed of individual manufacturing concerns. Many manufacturers, however, are grouped in sectional trade associations which have been formed for particular sections of the engineering industry. Although these Associations are primarily concerned with the problems peculiar to their section of the industry, quite naturally it has been found imperative to give attention to larger questions common to the whole of engineering. Thus there has been a certain degree of overlapping, and instead of the industry speaking with one voice it has tended to speak with several, none of which could be as effective as that of a large unified organisation.

Following conferences to consider what could be done to establish an even stronger central organisation, and as an initial step, certain sectional trade associations have linked up with the B.E.A., and from each of seventeen a representative serves on the B.E.A. Council. This enlarged Council has under active consideration the remodelling of the B.E.A. so as to make it more comprehensive in scope and representative in character. Meanwhile, bringing together prominent members of the principal sections

of the industry serves as a means of adjusting the relationships between groups of manufacturers in consonance with the changed and changing commercial conditions.

The restoration and expansion of our foreign trade after the war is vital to our national well-being. Neither full employment nor a rising standard of living will be possible without a strong revival of our export trade. Increasingly it is realised that export trade can no longer be conducted with success entirely along the lines established over the past century. New facilities of communication, the emergence of national States as competitors, the changed financial position of the United Kingdom are all factors leading British manufacturers to the recognition that the maximum of effort and collaboration will be imperative. Of £360 millions annual manufactured exports from the U.K. in previous years, the engineering industry contributed some £80 millions. In the face of severe handicaps the industry will have to increase exports substantially. It is well known that in pre-war years many of the smaller firms, though preponderating numerically, contributed relatively little to export trade. Through the B.E.A. they can be helped to foster such trade after the war.

The strength of every Association is, of course, dependent on what is put into it by the members, and throughout the history of the B.E.A. the engineering industry has been well served in this respect. The knowledge and experience of men drawn not only from the Governing Council but from the staffs of members have been given freely and unstintingly in the interests of the well-being of the industry, and at the present time such Committees as those concerned with taxation, export, continuity of employment, are particularly active.

The Association maintains close contact with other organisations such as the Federation of British Industries and the British Electrical and Allied Manufacturers' Association. A joint committee has been set up with the latter to consider all questions connected not only with the close co-operation of the two bodies but with the whole question of the better integration of the interests of the mechanical and electrical engineering industries.

In conclusion, some words from Lord Woolton, who took lunch with the Council of the Association following on his appointment as Minister of Reconstruction, will bear repetition. Appealing to the industrialists to bring to the period of reconstruction that same sense of national devotion and subjugation of self-interest shown so magnificently when the country was in danger, he went on to say:—"The country is still in danger. The danger to its physical life has not passed, unfortunately, and its commercial life will remain in danger for some years to come. We shall need all the commercial wisdom and foresight in the immediate post-war years if we are to rebuild our national prosperity."

Recovery of Debts

Wartime Protection of Creditors

By F. E. Sugden, A.C.I.S., Barrister-at-Law

IN a previous article in this journal, I showed how the Liabilities (War Time Adjustment) Act, 1941,* helped a debtor who was affected as a consequence of the war in meeting a claim made by a creditor. As in most other legal matters there are two sides to the story and the creditor sometimes also desires due consideration.

I may again mention that individual firms and private limited companies who are in actual or prospective financial difficulties are entitled to relief under the Liabilities (War Time Adjustment) Act, if these difficulties are due to war circumstances. For instance, a person may be unable to meet debts already accrued, or unable to meet, as they fall due, future liabilities in respect of obligations already incurred; or he may be able to do so but only in ways which would leave him with no reasonable prospect of preserving his business or even recovering it later and thus he would be deprived of his livelihood. Any person may apply; he need not be insolvent before he makes application.

Some creditors have complained that they have tried to recover money due from debtors but have been prevented by the Courts (Emergency Powers) Acts, 1939–40. Other creditors have complained that debtors have simply paid debts to the first and subsequent creditors who have threatened him with legal proceedings. This is foolish from the debtor's own point of view because he is protected by the Courts (Emergency Powers) Act, if his position is brought about as a consequence of the war.

The position is thus reached in which the debtor has used up his money and unfortunately the last few creditors have been unlucky and have not been able to recover their debts. If the debtor had applied for a Liabilities War Time Adjustment Order no doubt all his creditors would have received a small sum in fair proportion and at the same time the debtor himself would have been duly

* *Electrical Review*, May 30th, 1941 (p. 698).

assisted. It is the old story of first come first served, and the creditor who is modest and withholds his claim to the end is sometimes unlucky. Now, even though his modesty still remains, he has a right under the Liabilities (War Time Adjustment) Act against the debtor.

There is an erroneous idea abroad that only debtors can make application under the Act, but the creditor himself can also apply where the debtor fails to pay his debts when he should have made some amicable arrangement with his creditors or have applied for relief under the Act.

The creditor has a definite right to make application in the two following circumstances: where he is prevented by S.R. & O. 1940 No. 1209, which has reference to the protection of a debtor whose premises are in an evacuation area and whose premises are unoccupied at the date when the area is declared to be an evacuation area, etc.; and, secondly, where the debtor has been granted and is still enjoying relief under Section 1 of the Courts (Emergency Powers) Act, 1940. In the latter case any creditor who has a provable debt may apply. A provable debt is one that is recoverable in accordance with Section 17 of the Liabilities (War Time Adjustment) Act which refers to provable debts in bankruptcy.

Application to Adjustment Officer

If these requirements are fulfilled, the creditor, or his duly accredited agent, should apply to the Liabilities War Time Adjustment Officer in his own area and he will then have to fill in certain forms and make an affidavit declaring that the debtor is indebted to him for a specific sum. He also has to state that the debtor carries on business within the district of the Court and that he (the creditor) is prevented by the Defence (Evacuated Areas) Regulations Act, 1940, from taking proceedings against the debtor in respect of the debt, or that the debtor is still enjoying relief under Section 1 of the Courts (Emergency Powers) Act, 1939–40, by virtue of an Adjustment Order of the specific date. He may also state that the debtor is, or will be, unable to meet his obligations if he is prevented from making some arrangements by virtue of the debtor's past conduct.

The question of fees will arise. The rule of the Court is that no fee is chargeable for consulting an Adjustment Officer or his assistant in negotiating a scheme of arrangement. A scheme may provide for meeting any special expenses such as the cost of administration, but in any case of hardship even these expenses may be reduced or remitted. Of course, where large or valuable interests are involved, the Adjustment Officer may assess fees and provide in the scheme for their payment. In adjustment proceedings in Court certain fees are prescribed, but are not payable until an Adjustment Order is made, and may be reduced or remitted on grounds of hardship.

There is no limitation to the relief under this Act if all the creditors and the person concerned agree. For instance, a scheme may provide for the composition or postponement of debts, the realisation, assignment or charging of property for the benefit of the creditors and the management of the debtor's business or property. It may be administered by the Adjustment Officer, or otherwise. If accepted by a majority in number and value of creditors proving their debts and approved by the Adjustment Officer, a scheme binds all creditors with provable debts who have previously had due notice, subject to a right of appeal to the Court by a dissentient creditor on certain grounds. There is provision for varying or revoking a scheme later, if, for example, other creditors are discovered, or the debtor fails to comply with the scheme.

I should point out that a debtor availing himself of the adjustment procedure does not thereby commit an act of bankruptcy, nor is he disqualified from any office for which under any enactment he would be disqualified by bankruptcy or by entering into a composition or arrangement with his creditors, but if the creditor makes application when bankruptcy proceedings have been commenced and they have reached the stage of receiving order, the Court cannot entertain an application for an Adjustment Order unless the bankruptcy proceedings have been stayed.

The Court will hear the case in the usual manner and may either dismiss the application or, if satisfied that a *prima facie* case has been made out, refer the debtor's affairs, or any question in the proceedings, to the Adjustment Officer or to the Registrar of the Court for report and such other directions as the Judge may think fit as to the conduct of the proceedings. The hearing will then be adjourned until the report has been received and considered.

Sealing-in Glass

BY comparison with the detailed information available of the capabilities of American products, hardly anything seems to be known of the varieties of glass made in Britain for sealing metal electrodes into evacuated glass bulbs and tubes for electronic and X-ray purposes. Therefore the technical data sheets of the six varieties of glasses specially manufactured by Chance Brothers, Ltd., Smethwick, Birmingham, should be welcome. The information is set out in a form that will enable designers and glass-workers not only to select the right varieties for particular jobs, but also to estimate the quality of performance that may be expected of the finished envelope. The six varieties made for sealing-in different kinds of metal leads and electrodes are available in rod and tubing as well as bulbs which can be blown to shapes required by customers.

ELECTRICITY SUPPLY

Alleged Breach of "Truce." Supply to Scottish Farms.

Fife.—COMPLAINT OF BREACH OF "TRUCE."—At a meeting of Fife Catering Committee a letter was read from the engineer and manager of Kirkcaldy Gas Department in connection with the Committee's decision to give a monopoly to Fife Electric Power Company for the supply of power to the kitchens. The manager wrote that he was sure the Committee had been misled regarding the economics of the offer, which in itself appeared to be a breach of the truce between the gas and electricity industries agreed to for the duration of the war. In order that the matter might be investigated he asked for particulars of the offer for submission to the Scottish Management Committee of the National Gas Council. In the discussion which followed it was stated that the Committee was satisfied that the terms from the Fife Power Company were the best they could get, and it was pointed out that the Committee had to have electricity because of the equipment. The clerk was instructed to reply to the gas manager's letter, one member commenting that if there was a truce the electricity company could supply the gas manager with the particulars he wanted.

Glasgow.—SUPPLY TO FARMS.—The Clyde Valley Electrical Power Co. proposes to erect a high-voltage overhead line to supply farms in the East Kilbride area and has asked the Corporation if it would be prepared to contribute towards the cost of the scheme in respect of the inclusion of one of the Corporation's farms. The proposal is to be considered by a subcommittee.

OVERHEAD LINES.—The Corporation Health Committee has granted permission to the Strathclyde Electricity Supply Co., Ltd., to erect lines over land at Mearnskirk Hospital.

Pontypool.—PURCHASE OPTION EXTENDED.—The Electricity Commissioners have extended for a year from December 17th next the period at the expiration of which the Pontypool and the Abercarn Urban District Councils may purchase those portions of the Pontypool Electric Light & Power Co.'s undertaking authorised by the Abersychen Electricity Special Order which are within their respective jurisdictions.

Romsey.—PUBLIC LIGHTING.—The Town Council is negotiating with the West Hants Electricity Co. in connection with a scheme for lighting the streets by electricity.

Sheffield.—PROPOSED TARIFF INCREASES.—Further details have been published of the proposed increases in electricity charges recommended by the Electricity Committee. A 10 per cent. increase is proposed in domestic tariffs, as well as in those for shop, industrial, cinema, and theatre, etc., lighting, and for charging batteries of electric vehicles. The ordinary flat rate of 1d. per kWh for power consumers who use upwards of 10,000 kWh per annum is to be increased by 10 per cent., and the basic figure of the coal clause will be fixed at 23s. 6d. per ton.

West Hartlepool.—OVERHEAD LINE.—The Town Council has considered a plan from the North-Eastern Electric Supply Co., Ltd., for the erection of an overhead line from Hart Moor to Seaton Carew Works. The Council suggested that part of the line should be placed underground. In reply, the company stated that the erection of the line overhead was only a temporary measure and when the adjacent land was developed the cable would be laid underground. Following this assurance the Council has decided not to object to the plan.

Overseas

Argentina.—POWER PRODUCTION IN 1943.—Figures published by the Argentine Association of Producers and Distributors of Electric Energy (representing about 95 per cent. of the aggregate output of the country) show that the production of power during 1943 amounted to 2,718 million kWh, as compared with 2,574 million kWh in 1942, an increase of nearly 6 per cent.

Tasmania.—PRICE OF LAUNCESTON UNDERTAKING.—The electricity undertaking of the Launceston City Council—the only remaining local authority undertaking in the island—is being compulsorily acquired by the Tasmanian Hydro-electric Commission. As the two parties were not able to agree on the terms, the case was submitted to arbitration. Under the award made by the umpire the municipality is to receive £244,000.

RADIO & TELEPHONY

France.—TWO RADIO NETWORKS.—Liberated France has two radio systems broadcasting to its people, says a reporter at *Reuter's* radio station. The national French radio system of the Southern zone has now made its appearance, using the former Vichy transmitters. Its liaison with the radio system of the Northern zone is still by wireless. The same channels are used for service messages and important communications of the French Forces of the Interior from both Northern and Southern zones.—*Reuter.*

London.—NEW TELEPHONE EXCHANGE.—An automatic telephone exchange called "Monarch," serving part of the City of London, was opened on September 1st.

Madagascar.—TELEGRAPH AND TELEPHONE SERVICES.—A report on the operation of the telegraph and telephone communications of Madagascar published in a recent issue of the *Journal des Télécommunications* covers the year 1942, during the latter part of which the island was occupied by Allied forces. Use of the services by the public was consequently interfered with. In addition, owing to the shortage of material, no noteworthy extensions of the service were possible during the year nor could any new user installations be carried out. At the end of the year the length of the overhead telegraph lines in the island amounted to 10,528 miles, of which 2,364 miles were used for telephone purposes. There were 149 telegraph offices, apart from 80 at railway stations, 31 radio-telegraph offices and 12 telephone exchanges.

Service Units

Improvements for Post-War Houses

By E. W. Faithfull, A.M.I.E.E.
(Borough of Chepping Wycombe Electricity Department)

INTEREST in the adequacy of electrical installations in post-war houses is being maintained by many letters and articles in the technical Press, but one aspect which has not yet received much consideration is the service arrangements. The revised eleventh edition of the I.E.E. Wiring Rules (December, 1943) makes single-pole fusing compulsory for new installations (Reg. 112), and the opportunity may therefore be taken to simplify the fusing systems. At the same time the obvious advantages of the modern cartridge fuse should lead to the displacement of the rewirable type.

It is suggested that a service unit should be evolved which would embody sealing chamber, meter, cut-out and main switch with consumer's sub-fuses neatly arranged with all connecting cables under cover. Some idea of the load to be expected in post-war houses is necessary before the final details of such a service unit can be adopted. It may be assumed that a reasonably full use will be made of the many electrical appliances which will be available; adequate capacity of cables and switchgear is therefore essential.

In the average house or bungalow of six rooms, assuming the use of electric cooker, water-heater, fires, drying cupboard, refrigerator and washing machine, the installed load may be anticipated at 26 kW. Allowing a diversity in the use of the equipment of 3, a maximum load of 9 kW has to be catered for. The minimum size of service cable under these conditions should be 0/·0225 sq. in. twin. The supply authority's main fuse should be of the h.r.c. type 60-A size. For large houses three- or four-core cable could be used to obtain balance, at the same time retaining the 60-A fuse.

A service unit embodying these features, which has been constructed by the writer, comprises a sheet metal box 20 in. high, 16 in. wide and 7½ in. deep. It is intended to be built into one of the outside walls of the house, preferably under the staircase.

Assuming the usual brick construction with 12-in. cavity walls, then by utilising the air space, the unit can be mounted with the doors flush with the inside wall, thus avoiding projection into the cupboard. Access is obtained by two hinged doors and the cut-outs, meter and consumer's equipment are mounted on a removable insulated base, which allows ease of connection.

With both doors of the service unit open (above) all live parts are covered and access is provided to the meter and consumer's fuses only. Removal of terminal covers (left) gives access to main fuse, meters, busbars, links and main switch

On the left side of the panel are mounted sealing chamber, 60-A h.r.c. fuse, neutral link, and meter; on the right side is a 60-A triple-pole rotary switch, the handle of which is fitted on outside the door, which is prevented by an interlock from being opened until the switch is turned off. Single-pole "Zed"-type cartridge fuses are mounted between two copper busbars, and by means of links any fuse may be connected to either of the bus-

bars; 30-A fuses are used for cooker and heating circuits and 15-A and 10-A for water heating and lighting, the different sizes not being interchangeable. Two busbars are provided in order that two meters may be connected should the consumer adopt a flat-rate tariff for lighting and heating. Alternatively, if load control is adopted by the electricity supply authority, the relay may be readily connected by altering the appropriate link.

The main switch must be connected on the consumer's side of the meter, as otherwise if the switch is turned off and a prepayment meter employing a synchronous motor is used, the consumer can effect a considerable saving in the fixed charge. Two removable covers completely enclose and seal all live connections, whilst permitting the consumer access to the house fuses.

It is intended that the connection of meter leads and links should be carried out by the supply authority's inspector when the installation is tested and connected; the covers are then placed in position and sealed, thus preventing unauthorised interference with the connections. When the service is overhead, the sealing chamber is removed; this uncovers a 1½-in. hole in the back of the panel, through which the lead in is brought, the unit thus being adaptable for both types of service.

Earthing Methods

The present varying practice of earthing the electrical installation should receive attention; some authorities insist on earthing to the lead sheath of the service cable, others will not allow this, but earth to the water main. This matter was considered by a joint committee of the I.E.E. and the Metropolitan Water Board in 1926 and again in 1936, when various recommendations were made, one of which (Cl. 4) reads: " An earthing connection shall only be made to a buried water main or water pipe after notice to, and in a manner approved by, the water authority concerned." A note is added calling attention to the fact that non-metallic water pipes are in use, and the electrical implications of this should be recognised. It would appear therefore that, while earthing to water mains, efficiently carried out, is permitted, it is not welcomed, and its dangers should be appreciated.

The writer is of the opinion that where the service is provided by underground cable, the installation, together with the service unit and any apparatus with metal covers mounted thereon, should be bonded to the cable sheath. This should provide the only earth connection, assuming, of course, that all cable joints in the distribution system are effectively bonded. This will ensure that a direct path to the substation and transformer neutral is provided for all leakage currents.

Where installations are bonded and earthed to the water system, a definite risk exists that at some time, due perhaps to structural alterations, the water pipes may be altered or perhaps cut off without the knowledge of the electricity authority, the earthing system being thereby rendered useless. A further risk within the writer's knowledge is that a water fitter may cut the water service pipe outside the house for repairs at a time when a fault is actually on the installation and thereby receive a shock. Finally, to expect the water authority to carry fault currents for the electricity department is unreasonable. With overhead construction, however, earthing to the water main, where available, seems the only practicable course, but every precaution should be taken to ensure an effective bond to the rising main.

An even higher degree of continuity of service than has yet been possible will undoubtedly be demanded in the future and one method of ensuring this is the provision of a reliable main fuse of adequate size. The 60-A h.r.c. cartridge type seems eminently suitable, but the manufacturers must ensure adequate surface contact area, as in some cases this is the weakest part.

Swedish Water Power

Further Increase in Output

THE Vattenfallsstyrelsen, the department in charge of the Swedish Government-owned hydro-electric power stations, has just published a report about 1943 activity. Consumption of electric power in the districts obtaining power from the Government-owned stations has increased by 10·7 per cent. in comparison with the previous year. The energy sold totalled 4,357 million kWh. Of this quantity 89·6 per cent. was produced by the Vattenfallsstyrelsen's own stations and by the two stations Hissmoforsen and Kattstrupeforsen, jointly owned by the Vattenfallsstyrelsen. The remaining 10·4 per cent. was bought from private plants, collaborating with the Government stations. The supply of water to the stations has been about normal, and no consumption restrictions have been necessary.

Another large new power installation on the Indalsälven river has recently been commissioned. Known as the Gammelänge station, it has been constructed by the Krängede Aktiebolag, owners of the Krängede station, controlled by Stockholm town and several big industries, including the SKF, Fagersta, Korsnäs, Sandvikens Jernverk and two large power combines, the AB. Bergslagens Gemensamma Kraftförvaltning and the Sydsvenska Kraft AB. The new station has been constructed at a point of the river where rapids were artificially created in 1796 when, as the result of a huge damming enterprise, the Ragunda Lake was emptied in four hours and the waterfalls at Storforsen disappeared. The Gammelänge station has two sets of turbines driving generators with a total capacity of 40,000 kW. When completed the station will have cost about 33 million kr. The power stations on the Indalsälven river are now yielding 40 per cent. of all the power generated in Sweden by hydro-electric stations.—*Reuter's Trade Service.*

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Vactric, Ltd.—In a statement accompanying the accounts for the past year, Sir Frederick Whyte, the chairman, emphasises the company's post-war programme for home and overseas trade, and says it intends very substantially to increase its manufacturing facilities. This post-war programme will require larger resources and it is proposed to increase the authorised capital from £250,000 to £400,000 by creating 600,000 ordinary 5s. shares ranking *pari passu* with the existing ordinary shares. In 1943-44 the company bought two further subsidiary companies, to which it attaches "very great importance, more particularly from the post-war angle."

The **Victoria Falls & Transvaal Power Co., Ltd.**—At the annual general meeting on August 31st, Mr. Arthur E. Hadley, chairman and managing director, said that while the amount of electricity supplied by the company in 1943 was 3·5 per cent. less than in the preceding year the forecast of future demand when the labour position became normal and new machinery for the gold mines could be obtained showed that considerable further demands for power might be expected.

The **London Passenger Transport Board.**—Funds available are not considered sufficient to justify an interim payment on the "C" stock and will be carried forward towards the payment of the interest for the year which falls due not later than May, 1945.

The **British Oxygen Co., Ltd.,** is paying an interim dividend of 8 per cent., 1 per cent. more than last year.

Brown Bros., Ltd., are again paying an interim dividend of 2½ per cent.

The **Dubilier Condenser Co. (1925), Ltd.,** is again paying a dividend of 10 per cent.

New Companies

Refrigeration & Electrical Products (London), Ltd.—Private company. Registered August 26th. Capital, £1,000. Objects: To carry on the business of manufacturers of, and dealers in, refrigerators, cold storage machinery, electrical appliances, vacuum cleaners, radio sets, washing and mincing machines, etc. Directors: F. H. Meyers, Flat 523, White House, Albany Street, W.1; L. H. Metz, 156, Beehive Lane, Ilford; and C. B. H. Fentiman, 32, Streatham Place, S.W.2. The first two are directors of the Automatic Refrigeration Co. (Leytonstone), Ltd. Registered office: 56, Finsbury Pavement, E.C.2.

Casson Electric Co., Ltd.—Private company. Registered August 26th. Capital, £3,000. Objects: To carry on the business of electrical, radio and general engineers, wireless service agents, etc. Directors: E. Casey, 125, Kings Road, Whalley Range, Manchester, and two others. Registered office: Walton's Buildings, 5, New Brown Street, Manchester.

Companies' Returns

Statements of Capital

Power Securities Corporation, Ltd.—Capital, £2,000,000 in £1 shares (1,000,000 7 per cent. cumulative participating preference and 1,000,000 ordinary). Return dated March 16th (filed April 22nd). 500,000 preference and 800,000 ordinary shares taken up. £1,300,000 paid. Mortgages and charges: Nil.

Hawksley's, Ltd.—Capital, £100,000 in £1 shares. Return dated April 20th (filed May 30th). 75,000 shares taken up. £69,000 paid. £6,000 considered as paid. Mortgages and charges: Nil.

Increases of Capital

Smiths Industrial Instruments, Ltd.—The nominal capital has been increased by the addition of £29,900 in £1 ordinary shares beyond the registered capital of £100.

Smiths Motor Accessories, Ltd.—The nominal capital has been increased by the addition of £349,900 in £1 ordinary shares beyond the registered capital of £100.

Mortgages and Charges

North-Eastern Electric Supply Co., Ltd.—Satisfaction to the further extent of £27,707 on August 3rd, of £2,202,039 3¾ per cent. consolidated debenture stock secured by trust deed dated April 2nd, 1942, and registered May 6th, 1942.

Bude Electric Supply Co., Ltd.—Satisfaction in full between August 30th, 1937 and August 8th, 1944, of series of £2,500 5 per cent. mortgage debentures authorised April 14th, 1908, and registered between May 4th, and September 10th, 1908.

Boothroyd Electrical Co., Ltd.—Satisfaction to the extent of £750 on July 1st, 1944, of debenture dated August 19th, 1933 and registered August 21st, 1933, securing £1,000.

Tye & Co., Ltd.—Satisfaction in full on June 26th, of debenture dated August 19th, 1931, and registered August 24th, 1936.

Receiver Released

Instanta Electric, Ltd.—W. B. Holden, 3, Abchurch Yard, E.C.4., ceased to act as receiver and manager on August 17th.

Liquidations

British Lighting & Ignition Co., Ltd.—Winding up voluntarily. Liquidator, Mr. F. D. Clough, 71, Edmund Street, Birmingham, appointed August 29th.

Bankruptcies

Irene F. Berners and **C. J. Berners,** trading as the Major Manufacturing Co., battery manufacturers, 98, Great Tower Street, London, E.C.—Discharge suspended for one year and three months; date of discharge October 25th, 1945.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK Exchange markets are passing through a quiet period. Good news from the war zones finds little reflection in the House. Gilt-edged securities are good, from which the inference can reasonably be drawn that money, being very plentiful, still demands employment, and that, while awaiting fresh war developments, investment is content to accept a low rate of interest. The heaviness of industrial prices, to which attention was drawn last week, has not yet been dissipated. While electricity supply shares retain their previous levels, the ordinary shares of the equipment and manufacturing companies lean again to the lower side. This is due more to lack of buying orders than to any noticeable pressure to sell. Bargain-hunters have been in evidence, though not in sufficient numbers to counteract the routine selling.

War Markets

The anniversary of the outbreak of war makes it of interest to review very briefly the course of prices over the five years' period. Without going into tediously long comparisons, here are a few examples of electricity supply shares, with the prices compared:—

Company	Aug. 31st 1939	To-day
	s. d.	s. d.
British Power & Light	25 6	33 6
City of London	29 6	31 0
County of London	39 6	44 0
Edmundsons	23 6	31 0
Electric Supply	47 0	47 6
London Electric	31 3	31 0
Metropolitan	43 9	43 0
Yorkshire	35 0	43 0

Victoria Falls on August 31st, 1939, stood at 65s. and to-day are quoted at 83s. 9d. Cable & Wireless ordinary was then 49 ; now it is 83.

In the group of ordinary shares in manufacturing and equipment companies some very substantial rises have occurred. This is a representative list :—

Company	Aug. 31 1939	Sept. 1 1944	Rise
	s. d.	s. d.	s. d.
British Insulated ..	83 0	115 0	32 0
Callender's	61 0	111 3	50 3
Crompton Parkinson ..	18 3	32 0	13 9
Enfield Cable	48 9	63 6	14 9
Ericsson Tel.	41 3	52 6	11 3
General Electric ..	75 0	93 3	18 3
Globe Telegraph ..	29 9	40 6	10 9
Hall Tel.	19 0	31 0	12 0
Henley's	18 0	27 0	9 0
Johnson & Phillips ..	38 0	79 6	41 6
Laurence Scott	9 6	13 6	4 0
London Electric Wire ..	28 6	37 6	9 0
Siemens	21 0	34 6	13 6
Telegraph Con. ..	38 0	56 0	18 0
West (Allen)	6 0	7 9	1 9

Electricity Supply

In this market, Northmets are again better with a rise to 44s. The anticipated partial alleviation of the street lighting regulations seems to have quickened the demand for all the shares in the group of supply companies. During the first raid period, and for a year or so after, the enemy might possibly have obtained indirect information useful to him had the utility companies' reports and accounts been presented in the usual manner. This can hardly apply under present conditions. Holders of the ordinary shares in the electricity supply companies, while they, the holders, have demonstrated every confidence in their investment by refusal to sell the shares, may well feel they are entitled to news as to how their companies stand at the present time. The financial year of the majority of the companies ends with December, and the lifting of the ban upon publication of normal reports might be effected without risk of the enemy benefiting from such information in respect of 1944.

The Falls Continue

Falls ranging in extent from 6d. to 2s. 6d. have occurred in nearly a score of prices in the equipment-manufacturing section. The dullness extends from such investment shares as British Insulated, Ericsson Telephones and Westinghouse Brake, to the more speculative E.M.I., Cossor, and E. K. Cole. There are declines of about 1s. 3d. in Lancashire Dynamo, Murex, Walsall Conduits, Mather & Platt. General Electrics at 93s. 3d. are 9d. down ; Vactrics, despite the unexpectedly good dividend, have lost 9d., at 17s. 6d. Allen West were lowered 1s. to 7s. 9d. It seems superfluous to observe that every one of these falls is due to sympathy with the general conditions current in the Stock Exchange industrial market as a whole.

Cable & Wireless

The Commonwealth Communications Council, which is studying the future of Empire communications, is reported to have recommended a reorganisation of these services. To carry this out, it is suggested that public utility corporations should be established here and in various parts of the Empire. One result would be to deprive Cable & Wireless of the telecommunication services which the combine now operates. The market declined to be disturbed by the prospect of what, on the face of it, looks to be an improbable happening. The British Treasury is a considerable holder of Cable & Wireless stock. The Government is also a member of the Communications Council. Inquiries in usually well-informed quarters were unsuccessful in eliciting definite information. The price of Cable & Wireless Preference at 115 is unchanged, the ordinary at 83

(*Continued on page* 358)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend Previous	Dividend Last	Middle Price Sept. 5	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies					
Bournemouth and Poole ..	12½	12½	64/6	..	3 17 4
British Power and Light	7	7	33/6	..	4 3 7
City of London ..	7	5½	31/–	..	3 11 0
Clyde Valley ..	8	8	42/–	..	3 16 0
County of London	8	8	44/–	..	3 12 9
Edmundsons:					
7% Pref. ..	7	7	34/6	..	4 1 4
Ord.	6	6	31/–	..	3 17 5
Elec.Dis.Yorkshire	9	9	45/6	..	3 19 6
Elec. Fin. and Securities ..	12½	13½	59/–	..	4 11 4
Elec. Supply Corporation ..	10	10	47/6	..	4 4 2
Isle of Thanet ..	Nil	Nil	18/–	..	—
Lancs. Light and Power ..	7½	7½	37/–	..	4 1 1
Llanelly Elec. ..	6	6	26/6	..	4 10 7
Lond.Assoc.Electric	3	4	25/6	..	3 2 9
London Electric	6	6	31/–	..	3 17 5
LondonPowerRed. Deb.	5	5	103½xd	..	4 16 7
Metropolitan E.S.	8	8	43/–	..	3 14 5
Midland Counties	8	8	41/6	..	3 17 0
Mid. Elec. Power	9	9	44/–	..	4 1 9
Newcastle Elec...	7	7	31/–	..	4 10 4
North Eastern Elec.:					
Ordinary ..	7	7	35/–	..	4 0 0
7% Pref. ..	7	7	35/–	..	4 0 0
Northampton ..	10	10	50/6	..	3 19 6
Notting Hill 6% Pref. (£10) ..	6	Nil	11	..	—
Northmet Power:					
Ordinary ..	7		44/–	+6d.	3 3 8
6% Pref. ..	6	6	30/6	..	3 18 8
Richmond Elec.	6	6	25/6	..	4 14 1
Scottish Power ..	8	8	41/6	..	3 17 2
Southern Areas	5	5	23/–	..	4 7 0
South London ..	7	7	29/–	..	4 16 7
West Devon ..	5	5	23/6	..	4 5 1
West Glos. ..	4½	3½	24/6	..	2 17 0
Yorkshire Elec...	8	8	43/–	..	3 14 5
Overseas Electricity Companies					
Atlas Elec. ..	Nil	Nil	7/6	+6d.	—
Calcutta Elec. ..	6*	6*	48/–	..	2 10 0
Cawnpore Elec...	10	7	40/–	..	3 10 0
East African Power	7	7	34/6	..	4 1 4
Jerusalem Elec...	7	5	29/6	..	3 8 0
Kalgoorlie (10/–)	5	5	11/6	..	4 7 0
Madras Elec. ..	4*	Nil	31/–	+6d.	—
Montreal Power	1½	1½	24½	–½	—
PalestineElec."A"	4*	5*	40/–	..	2 10 0
Perak Hydro-elec.	6	7	14/–	..	—
ShawiniganPower	83cts.	90cts.	16	+½	—
Tokyo Elec. 6%	6	6	28	+1	—
VictoriaFallsPower	15	15	4 1/16	..	3 11 7
WhitehallInv.Pref.	—	6	24/6	..	4 18 0

Company	Dividend Previous	Dividend Last	Middle Price Sept. 5	Rise or Fall	Yield p.c. £ s. d.
Public Boards					
Central Electricity:					
1955–60 (Civil Defence) ..	3	3	100	..	3 0 0
1955–75 ..	5	5	115	..	4 7 0
1951–73 ..	4½	4½	107	..	4 4 1
1963–93 ..	3½	3½	104½	..	3 7 0
1974–94 ..	3½	3½	101	..	3 4 4
London Elec. Trans. Ltd.	2½	2½	97½	..	2 11 3
London & Home Counties1955–75	4½	4½	111	..	4 1 1
Lond.Pass.Trans.:					
A	4½	4½	120½	..	3 14 8
B	5	5	121½	..	4 2 4
C	3	3½	70	–1	4 12 10
WestMidlandsJ.E.A. 1948–68 ..	5	5	108½	..	4 12 4
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	121	+1	4 19 2
Def.	1½	1½	30	..	5 0 0
Anglo-Portuguese	8	8	28/6	..	5 12 4
Cable & Wireless:					
5½% Pref. ..	5½	5½	115	..	4 15 1
Ord.	4	4	83	–½	4 16 5
CanadianMarconi$1	Nil	4cts.	10/–	..	—
Globe Tel. & Tel.:					
Ord.	8½*	5*	40/6	..	2 9 4
Pref.	6	6	30/6	..	3 18 8
GreatNorthernTel. (£10)	Nil	Nil	25½	+1	—
Inter. Tel. & Tel.	Nil	Nil	23	..	—
Marconi-Marine..	7½	7½	36/–	..	4 3 4
Oriental Tel. Ord.	16	10	51/9	..	—
Telephone Props.	6	Nil	20/–	+1/–	—
Tele.Rentals(5/–)	10	10	11/3	–9d.	4 9 0
Traction and Transport					
Anglo-Arg. Trans.:					
First Pref. (£5)	Nil	Nil	2/6	..	—
4% Inc. ..	Nil	Nil	6	..	—
Brit.Elec.Traction:					
Def. Ord. ..	45	45	1295	+20	3 9 5
Pref. Ord. ..	8	8	180	..	4 9 0
Bristol Trams ..	10	10	57/–	..	3 10 2
Brazil Traction ..	$1	$1½	26	–½	6 14 7
Calcutta Trams	5½	6½	72/6	+2/–	1 16 0
Cape Elec. Trams	5	6	25/6	..	4 14 1
Lancs. Transport	10	10	45/6	..	4 8 0
Mexican Light:					
1st Bonds ..	5	5	105½	–2	4 14 9
Rio 5% Bonds	5	5	105½	..	4 14 9
Southern Rly.:					
5% Prefd. ..	5	5	75	–½	6 13 4
5% Pref. ..	5	5	115½	–1	4 6 9
T. Tilling ..	10	10	60/–	..	3 6 8
West Riding ..	10	10	46/–	..	4 7 0

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price Sept. 5	Rise or Fall	Yield p.c.
Equipment and Manufacturing					
					£ s. d.
Aron.Elec.Ord. ..	10	15	61/–	..	4 18 4
Assoc. Elec. :					
Ord.	10	10	53/6	+1/–	3 14 9
Pref.	8	8	40/–	..	4 0 0
AutomaticTel.&Tel.	12½	12½	61/–	–1/–	4 2 0
Babcock & Wilcox	11	11	51/–	..	4 6 3
British Aluminium	10	10	50/–	..	4 0 0
British Insul. Ord.	20	20	115/–	–2/–	3 9 7
British Thermostat (5/–)	18½	18½	20/9	..	4 9 0
British Vac. Cleaner (5/–)	15	30	30/–	..	5 0 0
Brush Ord. (5/–)	8	9	10/9	..	4 3 9
Burco (5/–) ..	15	17½	17/–	..	5 3 0
Callender's ..	15	20	5 $\frac{7}{8}$	..	3 12 2
ChlorideElec.Storage	15	15	88/9	..	3 6 7
Cole, E. K. (5/–)	10	15	32/6	–6d.	2 6 2
ConsolidatedSignal	24	27½	6¾	..	4 1 6
Cossor, A. C. (5/–)	7½*	10*	25/–	–6d.	2 0 0
Crabtree (10/–) ..	17½	17½	42/–	–6d.	4 3 4
Crompton Parkinson Ord. (5/–) ..	20	22½	32/–	..	3 7 3
E.M.I. (10/–) ..	6	8	34/–	–6d.	2 7 1
Elec. Construction	10	12½	60/–	..	4 3 4
Enfield Cable Ord.	12½	12½	63/6	–1/–	3 18 9
English Electric	10	10	52/6	..	3 16 2
Ensign Lamps (5/–)	25	15	21/3	..	3 10 8
Ericsson Tel. (5/–)	22*	20*	52/6	–½	1 18 1
Ever Ready (5/–)	40	40	43/6	–1/–	4 12 0
Falk Stadelmann	7½	7½	35/–	..	4 5 9
Ferranti Pref. ..	7	7	31/3	..	4 9 7
G.E.C. :					
Pref.	6½	6½	34/–	..	3 16 6
Ord.	17½	17½	93/3	–9d.	3 15 1
General Cable (5/–)	15	15	15/–	..	5 0 0
Greenwood&Batley	15	15	46/–	..	6 10 4
HallTelephone(10/–)	12½	12½	31/–	–6d.	4 0 8
Henley's (5/–) ..	20	20	27/–	..	3 14 0
4½% Pref. ..	4½	4½	24/–	..	3 15 0
Hopkinsons ..	15	17½	68/9	..	5 1 9
India Rubber Pref.	5½	5½	23/6	..	4 13 9
Intl. Combustion	30	30	6¼	..	4 10 8
Johnson & Phillips	15	15	79/6	–6d.	3 15 5
LancashireDynamo	22½	22½	97/6	–¼	4 12 2
Laurence,Scott(5/–)	12½	12½	13/6	..	4 12 7
London Elec. Wire	7½	7½	37/6	..	4 0 0
Mather & Platt..	10	10	52/6	–¼	3 16 2
Metal Industries(B)	8	8½	50/6	+⅛	3 7 6
Met. Elec.CablePref.	5½	5½	21/3	..	5 3 6
Murex	20	20	98/9	–¼	4 1 0
Pye Deferred (5/–)	25	25	35/–	..	3 11 5
Revo (10/–) ..	17½	17½	43/–	..	4 1 4
Reyrolle ..	12½	12½	73/9	..	3 8 1
Siemens Ord. ..	7½	7½	34/6	..	4 7 0
Strand Elec. (5/–)	7½	10	8/–	..	6 5 0
Switchgear & Cowans (5/–) ..	20	20	19/–	..	5 5 1
T.C.C. (10/–) ..	5	7½	22/6	..	3 6 8
T.C. & M. ..	10	10	56/–	..	3 11 6
TelephoneMfg.(5/–)	9	9	12/–	–3d.	3 15 0
Thorn Elec. (5/–)	20	20	25/–	..	4 0 0
Tube Investments	20	20	96/3	..	4 3 0
Vactric (5/–) ..	Nil	22½	15/6	–9d.	6 8 7
Veritys (5/–) ..	7½	7½	8/–	..	4 13 9
WalsallConduits(4/–)	55	55	49/6	–1/6	4 9 0
Ward & Goldstone (5/–)	20	20	28/9	..	3 13 6
WestinghouseBrake	12½	14	77/6	–½	3 12 3
West, Allen (5/–)	7½	7½	7/9	–1	4 16 0

* Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from page* 356)

is only ½ lower, implying that no particular importance is attached to the matter so far.

Transport Stocks

Home Railway stocks have been described as a better market, but there is little in the prices to support the assertion. Southern preferred and preference stocks are lower. The latter, at 115½, is now one of the cheapest securities eligible for full trust investment ; the yield is £4 6s. 9d. per cent. on the money. London Transport "C" stock is down a point, at 70. British Electric Traction deferred at 1295 has recovered half of its last week's fall of 40 points. An upward reaction in Calcutta Trams took the price to 72s. 6d. In Brazilian Tractions there is little going on ; the shares are ½ down at 26. Amongst other "Latin Canadians", Mexican Light & Power fives are 2 points lower at 105½.

Montreal Light, Heat & Power

Montreal Light, Heat & Power at 24½ are ½ lower. When the Quebec Provincial Government announced last April its intention to expropriate the whole of the undertaking of the company—the largest concern of its kind in Canada—the first quarter's dividend of 38 cents per common share was paid as to 31 cents in one 31-cent share of the Southmont Investment Corporation, and the balance of 7 cents in cash. The cash portion was absorbed, however, by the non-resident tax, the result being that holders not resident in Canada received only the Southmont Investment shares by way of dividend. The company's reason for making the distribution in such an unusual shape was to provide its coffers with cash to fight the Quebec Government's move for expropriation. The price of the Southmont is 7½d. bid.

The incident stirs memories of a story about a company which in days gone by made a call upon its shares, then only partly paid. The shares were all to bearer, and not a single holder responded to the demand for money. So the company declared a dividend, and, as a condition of its payment, holders were required to lodge their certificates. It seems hardly necessary to add the sequel. The Montreal Company is, of course, in no way comparable to this concern, for it is not calling up money from its proprietors, and the Southmont shares have a saleable value.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

ASEA Electric, Ltd., T. A. Long and S. Fitch.—"Electrode holders for arc welding." 17002. November 30th, 1942. (563562.)

Automatic Telephone & Electric Co., Ltd., and W. L. Formby.—"Circuit arrangements for electromagnetic relays." 2206. February 10th, 1943. (563491.)

Automatic Telephone & Electric Co., Ltd., C. Gillings and C. E. Beale.—"Telephone or like systems." 2401. February 13th, 1943. (563504.)

A. D. Blumlein.—"Thermionic valve oscillators." 10472. June 17th, 1940. (563464.)

British Insulated Cables, Ltd., London Passenger Transport Board, T. C. Broom and H. J. Powell.—"Frog for the overhead conductor of an electric traction system." 6803. April 29th, 1943. (563457.) "Trail frogs for overhead electric traction systems." 6804. April 29th, 1943. (563458.)

British Thomson-Houston Co., Ltd.—"Construction of bushings for electrical apparatus." 6694/43. May 1st, 1942. (563449.) "Synchronising indicators for alternating-current systems," 6695/43. May 2nd, 1942. (563450.) "Electric apparatus and windings therefor." 6761/43. May 5th, 1942. (563452.) "Electric valve converting systems for energising a load circuit through a capacitance." 17729/42. December 18th, 1941. (563531.) "Saw-tooth wave-form electric oscillation generators." 1364/43. January 27th, 1942. (563569.)

E. C. Cork.—"Directional aerial systems." 14491. September 23rd, 1940. (563493.)

A. C. Cossor, Ltd., and A. N. Melchior.—"Oscillographic apparatus." 2458. February 15th, 1943. (563537.)

A. C. Cossor, Ltd., and A. H. A. Wynn.—"Thermionic valve circuits employing degenerative feedback." 2045. February 8th, 1943. (563486.)

N. Dixon, R. S. Robinson and W. T. Glover & Co., Ltd.—"Manufacture of covered wires and cables." 5214. April 1st, 1943. (563441.)

Dubilier Condenser Co., (1925), Ltd. (W. Dubilier).—"Electrical condensers." 6792. April 29th, 1943. (563456.)

General Electric Co., Ltd., and D. M. Heller.—"Blind-landing devices for aircraft." 6119. May 6th, 1942. (563469.)

H. Hughes & Son, Ltd., E. P. Harrison and A. J. Hughes.—"Means for ascertaining and measuring the direction of a magnetic field." 6796. April 29th, 1943. (563522.)

Landis & Gyr Soc. Anon.—"Multiple-pole automatic electric switch." 16778/42. December 2nd, 1941. (563528.) "Multiple-pole automatic switch." 3185/43. March 14th, 1942. (Addition to 563528) (563542.)

A. Landmann.—"Oscillatory circuits." 5719. April 28th, 1942. (563468.)

Mallory Metallurgical Products, Ltd.—"Electric contacting elements." 3068/43. February 25th, 1942. (563511.)

Marconi's Wireless Telegraph Co., Ltd.—"Apparatus for receiving as desired frequency or amplitude modulated carrier-wave signals." 2205/43. February 10th, 1942. (563490.) "Electrical apparatus including networks suitable for use for dual signal transmission." 5162/43. January 7th, 1941. (563520.)

M-O Valve Co., Ltd., J. A. Smyth and L. R. E. Windsor.—"Thermionic valves." 5723. April 9th, 1943. (563446.)

D. Napier & Son, Ltd., and F. R. F. Ramsay.—"Means for testing electrical ignition systems of internal-combustion engines." 2362. February 12th, 1943. (563502.)

W. M. Pannell and Pye, Ltd.—"Electric transformers, chokes and inductances." 3801. March 9th, 1943. (563517.)

Patelhold Patentverwertungs & Elektro-holdings Akt-Ges.—"Apparatus for scrambling signals." 6364/42. May 10th, 1941. (563471.)

W. S. Percival.—"High-frequency electrical apparatus." Cognate applications 7454/40 and 4487/41. April 25th, 1940. (563463.)

Rubery Owen & Co., Ltd., and E. Coupland.—"Flash welding." 5804. April 12th, 1943. (563448.)

H. B. Rubin.—"Interference suppressing circuit for radio reception and the like." 18261/42. December 3rd, 1941. (563564.)

Standard Telephones & Cables, Ltd.—"Selector switch for telecommunication systems." 2345/43. March 4th, 1942. (563501.)

Standard Telephones & Cables, Ltd., and J. A. Leno.—"Electric condensers." 2344. February 12th, 1943. (563500.)

Standard Telephones & Cables, Ltd., A. Brown and T. A. Marshall.—"Electric signalling systems." 2131. February 9th, 1943. (563434.)

A. H. Stevens (Electronic Laboratories, Inc.).—"Electrical invertor systems." 16789. November 26th, 1942. (563529.)

A. H. Stevens (Teleregister Corporation).—"Communications systems." 4631. April 7th, 1941. (563524.)

Taylor Electrical Instruments, Ltd., and D. Rich.—"Electrical galvanometers." 5319. April 2nd, 1943. (563442.)

Wilson Welder & Metals Co., Inc.—"Welding electrode holders." 2659/43. February 28th, 1942. (563509.)

H. Ziebolz.—"Electronic translating devices." Cognate applications 16476/42 and 16477/42. November 4th, 1941. (563561.)

Junior Institution of Engineers

A SERIES of "Forces meetings" is being held by the Junior Institution of Engineers on Fridays throughout this month at 6.30 p.m. at 39, Victoria Street, London, S.W.1. In each case a member of the Forces will present a paper on engineering in his country. To-night is the turn of the United States, followed by Australia, Canada and New Zealand on September 15th, 22nd and 29th, respectively.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Chepping Wycombe.—September 25th. Town Council. Supply and installation of an additional multi-stage high-lift centrifugal surface pump and electric motor to pump 50,000 g.p.h., together with control and switchgear, etc.—S. Young, borough water engineer, 70-71, Easton Street, High Wycombe (deposit £2 2s.)

Manchester.—September 11th. Electricity Committee. Coal chutes, etc., and dismantling of coal conveyor plant. (September 1st.)

September 12th. Transport Committee. Electrical wiring of new canteen and traffic and ticket offices at Princess Road depot and garage. Forms of tender, specifications, and conditions of contract may be obtained from the general manager, Corporation Transport Department, 55, Piccadilly, Manchester.

New Zealand.—November 28th. Public Works Department. Plant for Maraetai power station and 220-kV substations; turbine and generator plant; transformers; switchgear; synchronous condensers; overhead travelling crane, etc.

Oxfordshire.—September 12th. Smallholdings Sub-Committee. Provision of pumping machinery, etc., in connection with a scheme of farm water supply. Particulars may be obtained from the County Land Agent, 33, Castle Street, Oxford.

Orders Placed

Glasgow.—Corporation Water Committee. Accepted. Three electrically driven 250 gal. per hr. pumps (£12,048).—G. & J. Weir.

Sheffield.—Electricity Committee. Recommended. Three steam generating units (£525,450).—Stirling Boiler Co. Maintenance material for gas-filled cables (£1,302).—W. T. Glover & Co. Electric travelling crane (£9,735).—Babcock & Wilcox.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Bingley.—Maternity home; E. O. Robinson, surveyor and architect, Town Hall.

Brierley Hill (Staffs).—Works extensions, Green Lane, Lye, near Stourbridge; W. E. Homer, architect, 3-5, Church Street.

Darlington.—Engine house for J. Jennings & Co., Ltd.; H. B. Richardson, architect, Skinnergate, Darlington.

Darwen.—Pumphouse; G. Ashton, water engineer, Municipal Buildings.

Denbigh.—Isolation annexe at the Maternity Hospital, Ruabon; county architect, Wrexham.

Flint.—Additions to County School, Hawarden, for meals; and youth education centre, Shotton; county architect, Mold.

Huddersfield.—Nurses' home, Bradley Wood Sanatorium; borough engineer, High Street.

Ilford.—Restaurant, Temperance Billiard Hall (£3,819); Haines & Warwick, Ltd.

Lancashire.—Erection of central kitchen, Coppull, near Chorley; A. T. Nicholson, County Buildings, Fishergate Hill, Preston.

Liverpool.—Rehabilitation block at Broadgreen Hospital, and extensions at City Technical College; L. H. Keay, city architect, Blackburn Chambers, Dale Street.

Musselburgh.—Houses (47); R. Blyth, director of housing, Municipal offices, High Street.

Newcastle-on-Tyne.—Extensions, boiler house and workshops, Hawthorn, Leslie & Co., Ltd.; Purdie, Lumsden & Co., 25, Oxford Street.

Extensions and alterations to the Fleming Memorial Hospital; Stephen Easten, Ltd., Westgate Grange, Newcastle.

Northampton.—Works additions, Kingsthorpe Hollow; Advance Motor Manufacturing Co.

Northern Ireland.—Houses (24), Needham Street, Newry, for U.D.C.; C. Blaney, town surveyor, Town Hall.

Reconstruction of flax mill, Circular Road, Downpatrick, for A. Quinn; W. & M. Given, architects, Coleraine.

Oldham.—Extensions, Bank Top Mills, Wellyhole Street; Newroyd Mill, Ltd., cotton spinners, Oldham.

Additions, mill, Valentine Street; Oldham Ring Doubling Co., Ltd., cotton manufacturers, Bank Mill, Huxley Street.

Penryn.—Conversions at "Glenmorgan," Broad Street for municipal offices; borough surveyor, 24, Market Street.

Renfrewshire.—Alterations at Merchiston House, Johnstone, for Joint Committee of Management of Broadfield Certified Institution (electrical installation); Master of Works, 16, Gilmour Street, Paisley.

Rochdale.—Additions to workshops and nailing room at Tenterhouse Mill; Bleachers' Association, Blackfriars House, Manchester.

South Shields.—Factory (£100,000); Ministry of Works.

Staffordshire.—Buildings; G. Ward (Moxley), Ltd., builders, Baggott's Bridge, Darlaston.

Stirling. — Cinema, Drip Road, Raploch; Stirling Cinema and Variety Theatres.

Stockport.—Alterations, repairs and improvements to St. Petersgate Public Baths (£8,117); W. F. Garner, borough engineer, Town Hall.

Additions to Broadstone Hall School, Reddish; H. C. Stott, quantity surveyor, 3, St. James Square, Manchester, 2.

Block of shops and offices, Chestergate; Hurstead Estates, Ltd.

Towyn.—New wing to Towyn and District War Memorial Cottage Hospital; secretary.